THE VALUE OF SPORT AND PHYSICAL RECREATION TO TASMANIA

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Foreword

It is universally accepted that sport and recreation has value. We know that individuals are healthier and happier if they participate in sport and recreation. We also know that communities are well connected and people within them socially included where participation rates in sport and recreation are high. It is also increasingly accepted that these communities are attractive places to live and work.

While the benefits of sport and recreation are well known, until now there has been little research that identifies and quantifies the benefits of sport and recreation as a whole.

This ground-breaking research has objectively quantified the significant economic value of sport and physical recreation to Tasmania for the first time. It is the culmination of three years of research undertaken in partnership between the State Government, the Australian Innovation Research Centre and the University of Tasmania.

As Sport and Recreation Minister I see the findings of this report as both exciting and challenging.

It is exciting because it quantifies the contribution of volunteers in sport and recreation and indicates 36 500 Tasmanian volunteers contribute over three million hours of work each year, the equivalent of nearly 1 800 full-time jobs.

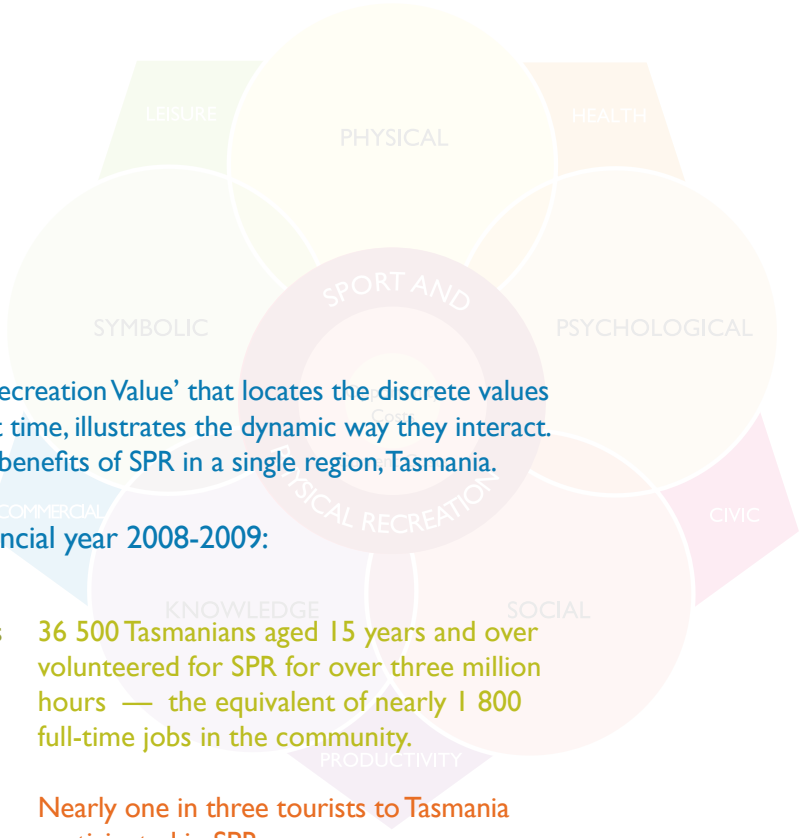
It is also exciting that the report shows sport and recreation pays for itself. Sport and recreation related expenditure generates more in revenue than the level of investment provided by all three tiers of government combined. The expenditure in sport and recreation and the jobs this generates shows that sport and recreation is a significant industry in Tasmania, directly contributing $819.3 million to the economy (3.6 per cent of gross state product) and enables the employment of over 13 000 people. For every $1 invested, Tasmania receives over $4 in benefits, with the combined annual value of these benefits conservatively estimated to be $5.6 billion.

The report shows that the majority of benefits of sport and recreation are directly related to participation rates and this is an area where there is room for improvement. It indicates that a 10 per cent increase in participation rates would generate an additional $903.5 million in annual benefits to Tasmania.

I encourage everyone to read it and hope it will promote debate and discussion on the contribution of sport and recreation to Tasmania. I congratulate all those involved in producing this ground breaking piece of work.

Michelle O'Byrne

Minister for Sport and Recreation



Highlights

This report introduces a model of 'Sport and Physical Recreation Value' that locates the discrete values of Sport and Physical Recreation (SPR) and, for the first time, illustrates the dynamic way they interact. The model used in this report estimates the costs and benefits of SPR in a single region, Tasmania.

The **key findings** of the report are that in the financial year 2008-2009:

The sum of benefits enjoyed by Tasmania as a result of SPR is conservatively estimated to be $5.6 billion, delivering over $4 value for every $1 invested by the whole community — that is a 400 per cent return.

The estimated contribution by all tiers of government to SPR of $100 million is repaid **50 times over** in returns to the community.

Our health system saved $60.2 million as a direct result of SPR-enabled physical activity. The financial cost of SPR injury was $3.1 million.

Tasmanian households, businesses and government collectively spent $613.1 million on SPR, and invested a further $677.2 million in labour and assets.

36 500 Tasmanians aged 15 years and over volunteered for SPR for over three million hours — the equivalent of nearly 1 800 full-time jobs in the community.

Nearly one in three tourists to Tasmania participated in SPR.

After paying $188.4 million in related taxes (nearly double the all-of-government investment in SPR) and employing over 13 000 people, Tasmanian firms enjoyed $184.4 million in profits that can be directly attributed to SPR.

There are even greater economic benefits to be had by investing in ways to encourage increased community participation in regular SPR.

Our principal finding is that although the current levels of investment in SPR yield a strong return, a more economically efficient outcome can be achieved by increasing the regular rate of participation. For example, a 10 per cent increase in SPR participation would generate an additional $905.3 million in annual benefits. The model proposed by this report is therefore a useful tool for enabling and explaining cost benefit analysis, and for evaluating SPR policy alternatives in support of this aim.

Executive Summary

Sport and physical recreation (SPR) has long been appreciated as an important contributor to the community; yet, in an age of increasing demand for government services — and ever scarcer resources — the question is being asked: what does SPR actually produce?

This report introduces a model of 'Sport and Physical Recreation Value' that locates the discrete values of Sport and Physical Recreation (SPR) and, for the first time, illustrates the dynamic way they interact. The model used in this report estimates the costs and benefits of SPR in a single region, Tasmania.

Figure 1 – The value of sport and physical recreation

Scope

Sport and physical recreation is defined as any physical activity undertaken for leisure that employs a degree of exertion beyond that required by day-to-day existence. This classification is intended to distinguish SPR from passive recreation and leisure. Wagered horse and dog racing are explicitly excluded from consideration at the request of Sport and Recreation Tasmania, who commissioned this report.

This report also defines value economically, as opposed to financially or philosophically. It assumes that SPR has value only if individuals place value upon it. To determine SPR's value to Tasmanian society, we aggregate from individual values.

This *Summary* has been published as a companion to *The Value of Sport and Physical Recreation to Tasmania (2008-09): Research Report*. For details about the source data and methods used, please refer to the complete document, which can be downloaded from the sites listed on the back cover.

It should also be noted that where figures have been rounded, discrepancies may occur between the sums of component items and their totals.

Only regular participants in SPR have the opportunity to receive the full set of benefits.

Tasmanian males aged 25-34 are significantly under-represented as both participants and volunteers in SPR.

Sport and physical recreation in Tasmania

Participation rates

Our **key findings** in relation to SPR participation in 2009 Tasmania are:

Just over half the Tasmanian population aged 15 years and over are not sufficiently active in SPR to receive the full health benefits of participation.

At-risk populations whose participation in SPR falls significantly under regular participation benchmarks, include:

- males, especially the 25–34 age cohort — a population often assumed to be highly active
- people with children under 18 years of age, especially if the children are not living at home
- people who have not gone on to post-secondary education
- people who are in full-time employment.

Other findings in relation to participation in 2009 are:

Nearly half of all Tasmanians aged 15 years and over regularly participated in SPR three times a week or more (46.6 per cent which is slightly below the national average of 47.7 per cent).

Participation rates have increased since 2005.

- In 2005, the regular participation rate among males was 40.9 per cent; this increased to 42.6 per cent in 2009.
- In 2005, the regular participation rate among females was 44.6 per cent; this increased to 50.4 per cent in 2009.

More females than males are regular SPR participants (50.4 per cent compared to 42.6 per cent).

The increase in regular participation over time is consistent with national trends, which are largely explained by an increase in participation in non-organised SPR.

- Regular participation in non-organised SPR has increased dramatically between 2001 (27.9 per cent) and 2009 (38.9 per cent).
- Regular participation in organised SPR has increased to a lesser extent between 2001 (9.3 per cent) and 2009 (12.4 per cent).

Just over 140 000 Tasmanians aged 15 years and over participated in SPR up to three times per week, an occasional participation rate of 34.9 per cent (the national average was 34.3 per cent).

An estimated 75 000 Tasmanians aged 15 years and over did not participate in any physical activity for exercise, recreation or sport in the 12 months prior to interview in 2009, a non-participation rate of 18.5 per cent (the national average was 18.0 per cent).

Despite generally volunteering more in the community than males, females only make up about one-third of SPR volunteers.

The labour of SPR volunteers is worth more than the entire contribution of government, and over six times the value of corporate donations.

Volunteering

Our **key findings** in relation to volunteering in SPR are:

Our current system of SPR critically depends on the contribution of volunteers; therefore, sustaining and enlarging this base should be a continuing priority.

Other findings in relation to volunteering in SPR are:

Over **36 500** Tasmanians aged 15 years and over volunteered for sport and physical recreation in 2008-09, for over **three million hours.** This was the equivalent of **1 791** full time jobs.

Nearly half of all regular SPR volunteers in Tasmania were actively involved in at least one other community group.

Males collectively volunteered for SPR at around one-and-a-half times the rate of females, despite female volunteering rates in non-SPR activities being higher.

The cost of sport and physical recreation

Our **key findings** in relation to the cost of SPR in Tasmania are:

The total cost of SPR to Tasmania in 2008-09 was **$1.3 billion.**

In using an Australian-first satellite account methodology, the post-tax expenditure of Tasmanian households on SPR was estimated to be **$491.9 million**, representing 5.2 per cent of all household spending.

Tasmanian businesses were estimated to have spent **$17.6 million** on SPR above and beyond their operating expenses. This figure is likely to be an under-estimate as it does not consider SPR-related expenditure on employee wellbeing.

The three tiers of government contributed a further **$103.6 million.**

Local Government directly spent **$29.9 million** on SPR, and controlled $819.1 million of SPR assets.

The Tasmanian Government directly spent $8.0 million on its SPR agency, Sport and Recreation Tasmania (SRT); however, we were also able to identify $62.6 million of expenditure on SPR by other State Government bodies; including the Department of Education, the Tasmanian Parks and Wildlife Service, Tourism Tasmania, the Department of Health and Human Services and the Department of Justice. The combined total of **$70.7 million** represented less than 1.8 per cent of the state's total outgoings.

Although we could only locate **$3.0 million** of recurrent Federal Government expenditure on SPR in Tasmania, significant capital contributions to SPR in the period were noted and allowed for in the assessment of opportunity costs.

The current (or direct cost) of SPR was $613.3 million.

The opportunity cost of SPR is low for the very young or very old, but quite high for those in higher earning age groups.

This may be a psychological barrier to participation.

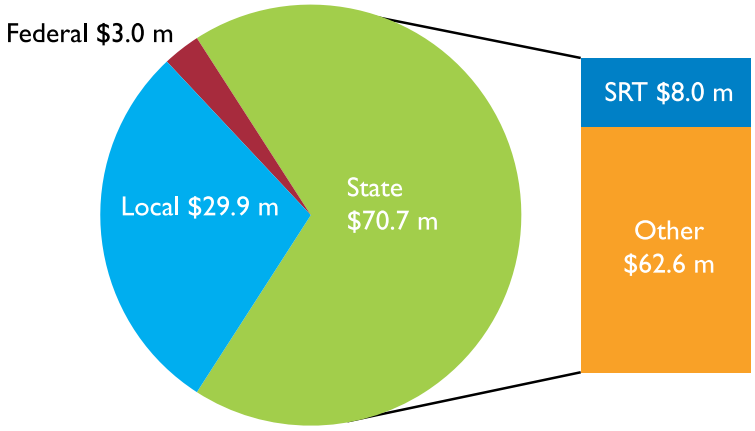
The opportunity cost of one hour of SPR participation or volunteering is identified by the income that could have been earned by working for that extra hour.

Using the average weekly earnings for part-time and full-time workers for each age group, less a 35 per cent marginal rate of tax, the effective labour cost of SPR in Tasmania was estimated to be **$646.6 million**. Of this, $609.9 million was attributable to participants, and $36.8 million was donated by volunteers.

Public ownership of SPR resources similarly prevents them being used for alternative endeavours. If a playing field associated with a school was sold because no value was placed on sporting activity by the community, then the value of land could be used to reduce gross government borrowing — our supposed next best alternative use.

The value of the opportunity lost through the public ownership of SPR assets was **$32.2 million**. In other words, if all of the state's publically owned SPR assets were sold and invested in the long-term money market, we might have expected a return in 2008-09 of $32.2 million.

Figure 2 – Government expenditure (current costs) on SPR in Tasmania (2008-09)



The agency assumed to have primacy over sport and recreation in the state, Sport and Recreation Tasmania (SRT), funds less than 10 per cent of whole-of-government SPR activity.

The contribution of Local Government, although split over 29 administrative bodies, is significant — especially as Local Government administers nearly $820 million-worth of dedicated SPR infrastructure. However, to conclude that Local Government is the biggest investor in the delivery of SPR is flawed given that substantial State Government expenditure is distributed across the individual budgets of multiple agencies.

This suggests a significant strategic challenge for public policy if SPR resources and knowledge are to be optimally distributed.

The opportunity cost of SPR was $678.8 million.

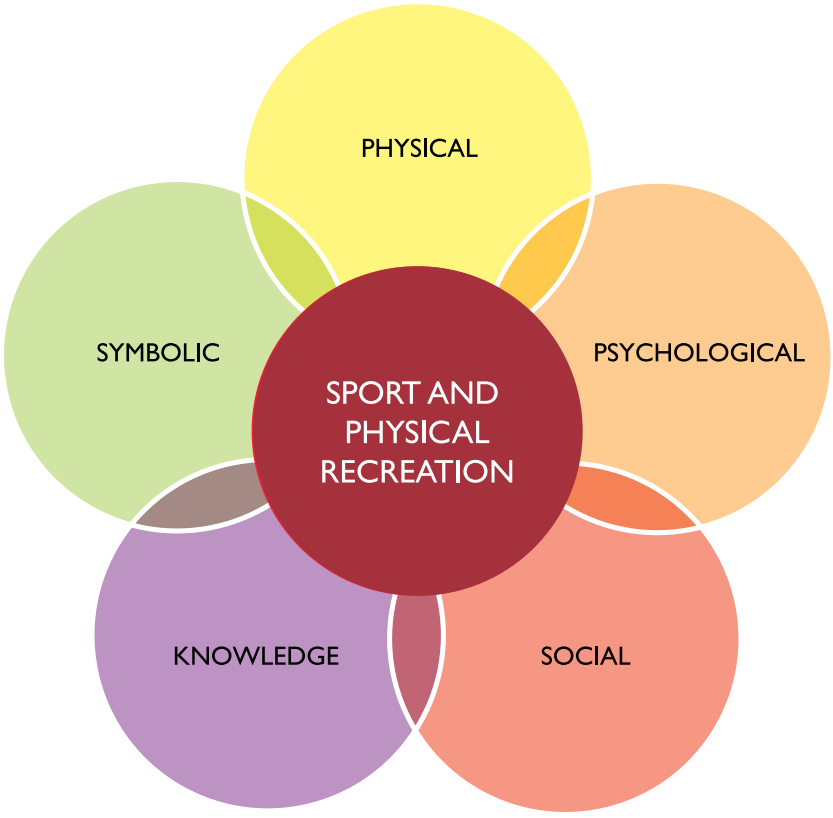
Sport and physical recreation capital

If economic capital is the sum of wealth created by an economy, natural capital is that found in an ecosystem, and intellectual capital is the wealth embedded in ideas; then, SPR capital would refer to any wealth or capacity that is attributable to sport and physical recreation.

In and of itself, however, capital is not productive. For SPR to realise the potential of the value that is stored within it, that capital must be employed. SPR capital is also a non-substitutable attribute that accrues discretely within individuals. It is only when citizens collectively express their SPR capital that its effect can be quantified and reconciled with costs to arrive at estimates of value. Importantly, that capital can be used positively (for example, to improve the health of a participant), or negatively (for example, to justify acts of vilification on the basis of SPR team membership).

SPR capital lies at the nexus between inputs (costs) and outputs. It is the store of potential that accrues in an individual as a result of their engagement with SPR. Economic expressions of SPR capital, or how that capital is employed, will be unique to each society, even though the potential — for good or bad — within SPR capital is theoretically uniform.

Figure 3 – Sport and physical recreation capital



Physical capital is the sum of the health, wellbeing, cognitive and other physical benefits (including, for example, stamina, dexterity and attractiveness) that result from participation in sport or physical recreation.

SPR has the potential to grow a person's physical capital, which can act in turn as a catalyst for more commercially and socially productive behaviour.

Psychological capital is a positive set of mental states (as opposed to dispositional traits) that can be influenced by a person's participation in SPR. It measures an individual's self-efficacy (or confidence), hope, optimism and resilience.

There are strong links between competitive sport and the nurture of psychological capital.

Social capital is 'the norms and social relations embedded in the social structures of societies that enable people to co-ordinate action to achieve desired goals'. In simple terms, it is a measure of a person's levels of trust, happiness, interpersonal networks and civic engagement.

Although there remains an inconsistent understanding of its economic value, social capital is conceptually embedded in the SPR literature.

Knowledge capital. The skills training afforded by sport, especially for those in supporting roles, is a form of technical knowledge. SPR exposure to teamwork and leadership also enlarges an applicable body of experiential knowledge in an individual that can realise commercial gain. A person's knowledge of sporting news and trivia can similarly be used to improve their worth to others.

As ethics are a learned value, the ability of SPR to 'build character' is best understood as a knowledge potential.

Symbolic capital describes the value derived from being known and recognised, a concept synonymous with standing, good name, honour, fame, prestige and reputation. Symbolic capital need not necessarily be confined to the elite domain – there is a limited form of symbolic capital observable in all hierarchies.

The potential of SPR endowed symbolic capital is multiple; it can be accrued in individuals, products and even sports themselves for financial leverage (brand); or, it can be used as a motivation for productivity in those who are deficient (inspiration).

The benefits of sport and physical recreation

SPR creates physical, psychological, social, knowledge and symbolic capital. This is then converted into a set of economically valuable outputs that contribute to the welfare of society. The following outcomes were observed in Tasmania in 2008-09.

It should be noted that some of these benefits are significantly underestimated. For example, the replacement cost of volunteers (a civic benefit) assumes that SPR labour could be replaced at the full-time equivalent rate – this is known to be impractical given the infrequent and occasional scheduling of SPR events. Similarly, the economic benefit of SPR enabled innovation is neither estimated nor assumed in other values because of its intangible (yet observable) worth.

Health benefits

The economic impact of premature morbidity and mortality on Tasmania that can be attributed to physical inactivity is estimated to be $823.2 million. People who are sufficiently active as a result of their regular SPR participation therefore avoid an additional cost to society of **$718.4 million**.

This benefit accrues to individuals and is distinct from the savings made by our government and private systems of health care. It also only considers a limited range of disease states that are known to result from physical inactivity, and is likely to be a significant underestimate.

The SPR benefits that flow to individuals can be valued at $4.9 billion.

Government directly enjoys $396.1 million in benefits.

Business profitability is enlarged by $314.0 million as a result of SPR.

Civic benefits

The cost of replacing SPR volunteers in Tasmania is conservatively estimated to be $107.7 million. If government or other civic institutions did not meet this shortfall, the absence of voluntary labour would increase the cost of SPR participation to households by $9.97 per week, or 120 per cent.

Our health system additionally saved $60.2 million as a direct result of SPR-enabled physical activity. This was over 20 times the financial cost of SPR injury, which was $3.1 million.

Taken together with the costs avoided by our systems of social and criminal justice, as well as the value added to the Tasmanian 'brand', the sum of civic benefits enabled by SPR is estimated to be **$207.7 million**.

Civic benefits unquantified by this report include environmental and democratic (or governmental) outcomes.

Productivity benefits

Regular participation in SPR contributes to productivity by adding value to an employee's skills, and reducing the costs of absenteeism to their employer and industry.

In 2008-09, that benefit was worth at least **$311.6 million**.

Importantly, our method includes in this figure any losses to industry that may result from a regular SPR participant's injury or intention to otherwise avoid work. It does not, however, quantify the contribution that SPR innovation makes to the gross productivity of the community; nor does it calculate the cost to society of physically inactive persons' lower rate of workforce participation.

Commercial benefits

Expenditure by tourists to Tasmania who were motivated by SPR was **$451.6 million**.

Using the Tasmanian Regional Input Output Matrix (RIOM) model, we estimated that the impact of SPR expenditure was to increase output in the Tasmanian economy by **$1.84 billion**. The increase in wages, rents, profits and taxes associated with the increase in production is estimated to have increased Tasmania's gross state product by **$819.3 million** (compared to an alternative case in which those resources were idle due to a lack of demand).

The expenditure associated with SPR is also estimated to have generated in the order of **13 000 jobs**, both full-time and part-time. This represents approximately 5.2 per cent of the Tasmanian workforce, or one person in 20.

The taxes generated by SPR-related or motivated expenditure was **$188.4 million**. This estimate is higher than the identified expenditure by all levels of government on Tasmanian SPR of **$103.3 million.** Fiscally, therefore, the sector pays for itself and SPR-related public expenditure generates a positive return. It is nevertheless noted that the taxation revenue that accrues from SPR is unlikely to be distributed equitably to those tiers of government that invest in it.

In 2008-09 SPR delivered a total of **$184.4 million** in profit to Tasmanian businesses.

Leisure benefits

Consumer surplus is a financial measure of the satisfaction that people get from their purchases above and beyond the amount they paid for them. For example, a person may pay $750 for a gym membership, but be willing to pay up to $2 000 for the benefits they receive from their subscription. This difference of $1 250 is the consumer surplus - an important economic criterion for decision making, especially in public policy.

In the first study of its kind, we uniquely identify here a "leisure" benefit of **$4.0 billion**. This is the consumer surplus that Tasmanian's enjoy as a result of their SPR, less the equivalent health and productivity benefits already counted.

Cost benefit analysis

The sum of SPR-enabled benefits enjoyed by Tasmanians in 2008-09 was conservatively estimated to be $5.6 billion. This realised a **net benefit of $4.3 billion.**

It has already been established that the taxation revenue enjoyed by all levels of government more than off-sets the amount it actually spends on SPR. This analysis shows that their annual investment of around $100 million is repaid a staggering **50 times over** in returns to the community.

Furthermore, the opportunity cost of all the hours donated by individuals to SPR (including occasional participants and volunteers) is more than compensated for by the health contribution of regular participants.

Table 1 – The costs and benefits of SPR in Tasmania ($m) (2008-09)

Costs			
Current			
Households	$ 491.9		
Government	$ 103.6		
Businesses	$ 17.6	$ 613.1	
Opportunity			
Participation	$ 609.9		
Volunteering	$ 36.8		
Assets	$ 32.2	$ 678.8	$ 1,291.9
Benefits			
Individuals			
Health	$ 718.4		
Productivity	$ 182.0		
Leisure	$ 3,997.4	$ 4,897.8	
Government			
Civic	$ 207.7		
Commercial (taxes)	$ 188.4	$ 396.1	
Businesses			
Productivity	$ 129.6		
Commercial (profit)	$ 184.4	$ 314.0	$ 5,607.9
Net benefit			$ 4,316.0

For every $1 invested in SPR, Tasmanians enjoy well over $4 in benefits.

The welfare potential of SPR is yet to be optimally realised.

Ideally, all government policies would improve the welfare of society. A policy that made at least some people better-off, while making nobody worse-off, would unambiguously improve social welfare. In economic theory such a policy is termed Pareto efficient.

Having established that SPR delivers a net social benefit, the question that remains is whether or not Tasmanians are receiving the optimal (or most Pareto efficient) benefit from their SPR.

The rate of regular participation is the variable on which SPR most keenly depends. International studies suggest that it is reasonable to aspire to a 10 per cent increase in the rates of SPR participation and volunteering, at the rate of one per cent per year.

Because market forces have settled upon the reported rates of household and business expenditure in SPR, it is theorised that a 10 per cent change in regular participation can only be effected by stimulus from government.

Therefore the final question advanced by this report is: how much should the government be willing to spend to approach Pareto efficiency?

A 10 per cent increase in the rates of SPR participation and volunteering, at the rate of one per cent per year, would yield a net present surplus of $3.9 billion over 10 years.

In other words, $3.9 billion in welfare benefits would be enjoyed by the community above and beyond the annual benefit at the current participation rate.

This suggests that the three tiers of government could effectively invest an **additional $386.5 million per year** into Tasmanian SPR to achieve this target, without any loss to the benefits presently received.

Once the 10 per cent increase was achieved, an annual net welfare benefit of $5.2 billion would be realised. This is $905.3 million, or **121 per cent greater** than what is currently returned.

In other jurisdictions, successful interventions in policy have achieved significant increases in participation for no more than a fraction of their current SPR investment. Given the current all-of-government expenditure on SPR in Tasmania of $103.6 million, it is more likely than not that the three tiers could comfortably achieve the +10 per cent target for much less than $386.5 million per year. Obviously, the difference between this theoretical maximum and their actual spend would be returned to the community as a surplus welfare benefit.

Therefore, we conclusively state that despite the benefits currently delivered to Tasmanians, the full potential of sport and physical recreation is yet to be optimally realised.

Conclusion

The findings of this study largely speak for themselves. If you could absolutely guarantee a minimum annual return of over 400 per cent on every dollar invested commercially, then there would be a run on the banks tomorrow. Although this result may be cause for celebration amongst advocates for SPR, the full potential of the industry is yet to be realised.

It is beyond the brief of this project to make recommendations as to how government investment in sport and physical recreation can be made more efficient. That would require the application of our model to specific programs and policy contingencies. The results reported nevertheless reveal a number of conclusions that should be of particular interest to public policy.

On the participative side, just over half of the Tasmanian population aged 15 years and over are not sufficiently active in SPR to receive the full health benefits of participation. The gap between male and female rates of regular participation should also be of concern. Furthermore, our current system of SPR critically depends as much on the contribution of volunteers as it does on the largesse of government; therefore, sustaining and enlarging this base should be a continuing priority in the delivery of SPR services.

From the perspective of economic impact, we challenge the conventional wisdom in demonstrating that participative SPR is of far more significance to the welfare of the community than the discrete economic impacts of elite sport. The taxation revenue that governments earn from SPR is also greater than the money they spend on the same — even if these returns are disproportionally allocated. SPR is an industry that influences economic activity across almost the entire spectrum of government and commercial interests.

To that end, there should be a concerted effort to more efficiently share the resources and knowledge embedded in SPR throughout society.

Our cost benefit analysis has also shown that because the benefits of SPR exceed the social costs, the outcome is effective; however, it is not optimally efficient. The effect of volunteer and government subsidies is to reduce the cost to participants of engaging in sport and physical recreational activity. The reduction in price moves participation closer to the level that could be achieved where individuals are able to fully internalise the benefits of sport to health, life expectancy and social capital. Nevertheless, increasing government investment in SPR has the potential to yield an exponential return, thereby moving the SPR economy closer to an optimally efficient outcome.

This study has ultimately examined whether those who donate their time and money to SPR are supporting the common good. Our hope for this report is that it educates readers to the economically real and significant value of sport and physical recreation.

All too often, advocates of SPR are accused of being evangelists, appealing to the intuition of their audience in the absence of economic reason. Even if some of the findings herein are to be contested, we would argue that this report is a major step towards filling a gap in the debate for (or against) sport and physical recreation.

Although there are a number of limitations to our findings that would benefit from future research, the potential now exists for decision makers in both industry and government to leverage this framework for continual improvement in the marketing and delivery of their services.

Opportunities for future research

This study has identified a number of gaps in our understanding of the empirical impacts of SPR in both Tasmania and around the world. Future research is therefore encouraged in the following areas:

- Tasmanian participation and volunteering in SPR including:
    - sub-regional and other demographic drivers
    - motivations for and constraints to participation.
- 'Sufficient' participation in SPR (and its relationship to regular participation).
- Participation in SPR by minors, and the antecedent costs and benefits.
- The role of professional sports in motivating engagement with SPR.
- Household expenditure on SPR (particularly in indirect categories).
- Business expenditure on employee welfare through SPR.
- The surpluses enjoyed by businesses who invest in employee SPR.
- Population attributable rates of inactivity for other disease states where there is a strong causal link between them and SPR participation (for example sexually transmitted disease, drug and alcohol addiction).
- SPR-related export activity.
- Regional brand value leveraged by SPR including:
    - replacement cost of media content
    - impacts on consumer behaviour.
- The environmental costs and benefits of SPR.
- Quantitative research into the workplace productivity benefits enabled by SPR.
- The contribution of SPR innovation to society.
- The impact of SPR identification on community wellbeing.
- The consumer surplus (or value in leisure) of SPR volunteering and spectating.

Contents

Tables and figures

Definitions

Economic event
An economic event is any transfer or diversion of a resource (labour and/or goods) from one party to another. In the sporting context, it can refer equally to an individual or groups' participation, facilitation (for example coaching, refereeing, sponsorship or administration) and/or consumption (for example spectating or following) of SPR. The only criterion for inclusion is that the economic event is dependent upon an SPR event.

Participation
Participation means active 'playing' participation in SPR, and does not include coaching, refereeing and being a spectator, or activities related to work, household chores or gardening duties.

Occasional participation
An occasional participant is any person who participated in at least one physical activity for exercise, recreation or sport at least once in 2008, but less than three times per week.

Regular participation
A regular participant is any person who participated in at least one physical activity for exercise, recreation or sport at least three times per week on average in 2008.

Organised participation
Organised SPR is defined here as physical activity for exercise, recreation or sport that was organised in full or in part by a fitness, leisure or indoor sports centre that required payment for participation; a sport or recreation club or association that required payment of membership, fees or registration; a workplace; a school; or any other type of organisation.

Sport and physical recreation (SPR)
Any physical activity undertaken for leisure that employs a degree of exertion beyond that required by day-to-day existence is considered SPR. Although participation in professional sport may not be leisurely, as a form of consumer entertainment its purpose is for leisure.[2]

Volunteer
A volunteer is someone who willingly gives unpaid help in the form of time, service or skills, through a sport and physical recreation organisation or group.

[2] Horse and dog racing are excluded from consideration in this report at the request of Sport and Recreation Tasmania.

1. Introduction

Sport and physical recreation (SPR) has long been appreciated as an important contributor to the community, yet has only recently been called upon to justify its public expense. In an age of increasing demand for government services—and ever scarcer resources—the question is being asked: What does SPR actually produce? Is it leisure? Fitness? Is it for social interaction? Is it meant to build character? Or is its purpose economic?

This report introduces a model of 'Sport and Physical Recreation Value' that begins to locate the discrete values of SPR and, for the first time, illustrates the dynamic way in which they interact. This is presented graphically in *Figure 1.1* below. The model employed in this report estimates the costs that attach to, and the range of community welfare benefits that arise from, SPR in a single region, Tasmania.

Scope

Sport and physical recreation is defined as any *physical* activity undertaken for *leisure* that employs a degree of exertion *beyond* that required by *day-to-day existence*. This classification is intended to distinguish SPR from passive recreation and leisure. Wagered horse and dog racing are explicitly excluded from consideration at the request of Sport and Recreation Tasmania, who commissioned this report.

This report also defines value economically, as opposed to financially or philosophically. It assumes that SPR has value only if individuals place value upon it. Value is typically measured in terms of trade-offs and is relative; in this instance we use money as the unit of account. To determine SPR's value to Tasmanian society, we aggregate from individual values.

It is beyond the scope of this study to distinguish the costs and benefits of SPR by performance (for example cricket, soccer, or bushwalking), geography (except as it is defined in the title), or even ideological space (for example elite versus participative endeavour; individual versus organised activity). Although we separately discuss an individual or groups' participation, facilitation (such as volunteering, sponsorship or administration) and/or consumption (for example spectating or following) of SPR, it is the sum of all of these values that is reported.

The geographic scope of this report is the Australian state of Tasmania.

Figure 1.1 – The value of sport and physical recreation

2. SPR participation in Tasmania

To value the economic exchanges that occur, it is first necessary to quantify the way in which Tasmanians engage with sport and physical recreation (SPR).

The Exercise, Recreation and Sport Survey (ERASS) is a joint initiative of the Australian Sports Commission (ASC) and the state and territory government agencies responsible for SPR. Since 2001, ERASS has collected information on the frequency, duration, nature and type of physical activities that were participated in by persons aged 15 years and over for exercise, recreation or sport during the 12 months prior to interview. It provides estimates of long-term SPR behavioural habits and informs policy makers about the types of activities that contribute to population health (Merom, Bauman, & Ford, 2004).

Participation means active 'playing' participation, and does not include coaching, refereeing and being a spectator, or activities related to work, household chores or gardening duties. Although ERASS examines, among other things, organised versus non-organised SPR activity, the nature of our study does not demand this distinction.

The participation data reported here is from, and in a format consistent with, the ninth annual (and final) ERASS data collection, which was conducted in 2009 (ASC, 2010). For the purposes of this report, these figures stand in proxy for the financial year 2008-09. This report specifically compares the Tasmanian experience with national averages so as to benchmark local SPR engagement. These data sets are the foundation for the subsequent analyses in this report, particularly the cost benefit and marginal analyses.

The rate of SPR participation by people under the age of 15 is reported here from Australian Bureau of Statistics (ABS) data. Where possible, the costs and benefits of junior participation are accurately represented; however, in the absence of reliable information on the sufficiency of this participation, we have conservatively erred toward overstating the costs and underestimating the benefits of this activity.

Volunteering also forms part of this discussion. As SPR volunteering is also beyond the scope of the ERASS report, we use separately published ABS reports as our principal data source.

Figure 2.1 – SPR participation

Junior participation in SPR

In April 2009, the most recent Children's Participation in Cultural and Leisure Activities survey was conducted (ABS, 2009a).

- During the 12 months prior to interview, it is estimated that 39 200 Tasmanians aged between 5 and 15 years participated in organised sport and/or dancing, a participation rate of 61.1%.
    - This was the worst result of any state or territory. The national average was 68.7%.
- In the two weeks prior to interview, it is estimated that 26 200 Tasmanians aged between 5 and 15 went skateboarding, rollerblading or riding on a scooter, a participation rate of 40.9% (the national average was 49.3%).
- In the two weeks prior to interview, it is estimated that 44 000 Tasmanians aged between 5 and 15 years went bike riding, a participation rate of 68.6% (the national average was 60.4%).

There is no publically available trend data specific to Tasmania, although nationally it appears that participation in organised sports and/or dancing is on the rise since 2003 (+2.0%), while other data is too inconsistent to draw conclusions from.

The most popular organised junior sports in Tasmania (with their actual participation rates versus the national average) were:

Soccer (outdoor)	19.1%	+5.9%
Swimming	14.6%	-3.9%
Australian Rules football	10.0%	+1.4%
Netball (indoor and outdoor)	8.6%	+0.2%
Dancing	8.6%	-5.7%
Basketball	8.2%	+0.8%
Cricket (outdoor)	7.2%	+2.0%

With the exception of swimming and dancing, all of these sports reported junior participation rates that were higher than the national average. It is significant that the category reported as 'other organised sports' also reported a participation rate 4.9% lower than the national average.

This would suggest that junior Tasmanians' limited access to *diverse* forms of organised sport may be a barrier to their population-wide participation.

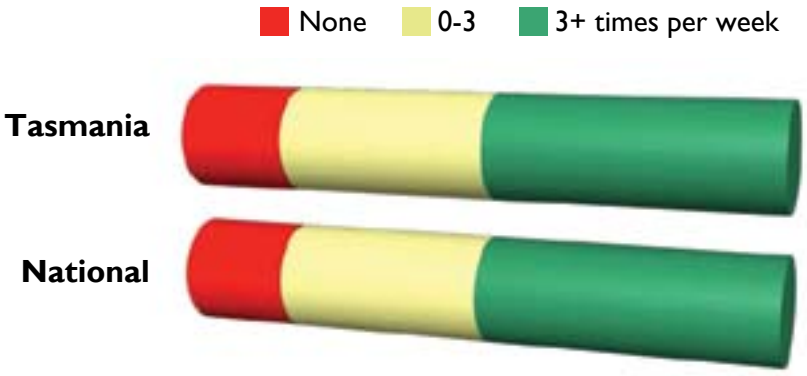
Adult participation in SPR

During the 12 months prior to the ERASS interview in 2009 it is estimated that:

- nearly 190 000 Tasmanians aged 15 years and over participated in SPR three times a week or more, a **regular participation** rate of 46.6% (the national average was 47.7%)
- just over 140 000 Tasmanians aged 15 years and over participated in SPR up to three times per week, an **occasional participation** rate of 34.9% (the national average was 34.3%)
- 75 000 Tasmanians aged 15 years and over did not participate in any physical activity for exercise, recreation or sport in the 12 months prior to interview in 2009, a **non-participation** rate of 18.5% (the national average was 18.0%).

As Figure 2.2 shows, when compared to national averages Tasmania has a higher rate of non- and occasional SPR participation. An extra 4 450 Tasmanians aged 15 years or over would need to participate regularly in SPR to meet the national benchmark.

Figure 2.2 – Frequency of participation in sport and physical recreation (2009)



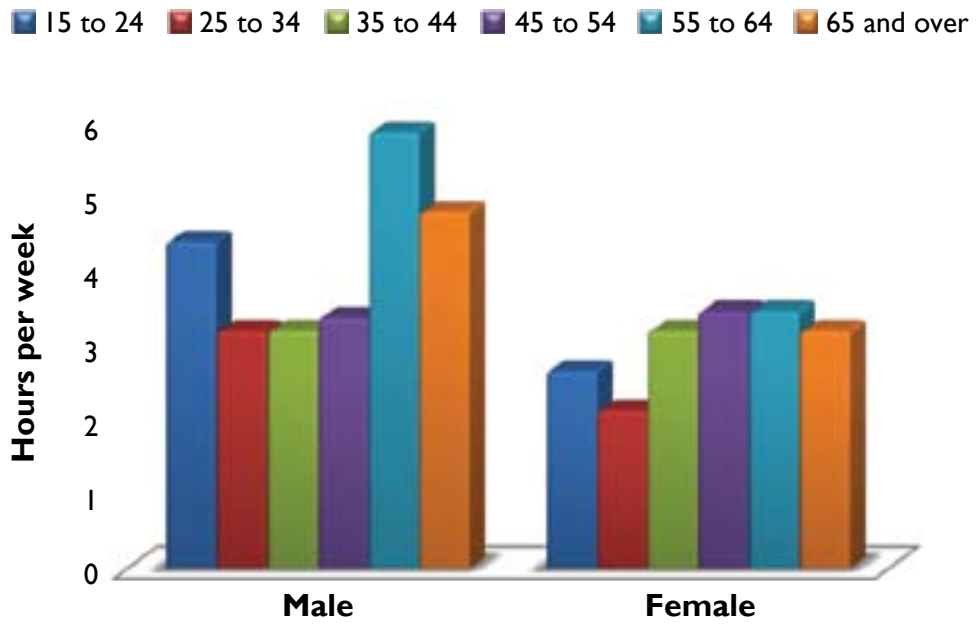
Median hours of participation in SPR

Figure 2.3 shows Tasmanian participants' median hours of SPR activity per week.

- Among males, duration of participation in any physical activity was highest among those aged 55–64 (median of 5.5 hours per week). Males aged 25–54 (between 3.0 and 3.2 hours per week) were the worst performers in this regard.
- By contrast, female duration of participation in any physical activity was highest among those aged 35–54 (between 3.0 and 3.3 hours per week). As with males, females aged 25–34 were the least active.
- The median hours of SPR activity for males was 3.5 hours per week, which was significantly greater than the national average of 3.0 hours. Females, at a median of 3.0 SPR hours per week, were within seven minutes per week of their national average.

Note that state-level data on median hours of participation is not published in the ERASS report. We are grateful to the ERASS authors, Newspoll, for their cooperation in making it available here.

Figure 2.3 – Median duration of participation in SPR by age and gender in Tasmania (2009)



Nature of SPR participation

Just over 330 000 Tasmanians aged 15 years and over (81.5%) are estimated to have participated at least once in SPR in 2009 (the national average was 82.0%).

- Of all activities, walking for SPR had the highest total participation rate (41.4%). An estimated 168 000 Tasmanians aged 15 years and over walked at least once for SPR in the 12 months prior to interview.
    - This excluded bushwalking, which is categorised separately and had a total participation rate of 7.7%.
- Other sports and physical activities with relatively high total participation rates were aerobics/fitness activities (16.5%), swimming (11.6%) and cycling (8.9%).

Gender differences

Walking had the highest total participation rate for both males (31.0%) and females (51.4%).

- For males, other activities with the highest total participation rates were running (12.9%), cycling (12.7%), aerobics/fitness activities (10.8%), golf (10.9%), and Australian Rules football (10.4%).
- For females, other activities with the highest total participation rates were aerobics/fitness activities (22.0%), swimming (14.4%), bushwalking (7.3%), running (5.9%), cycling (5.1%), and netball (5.2%).

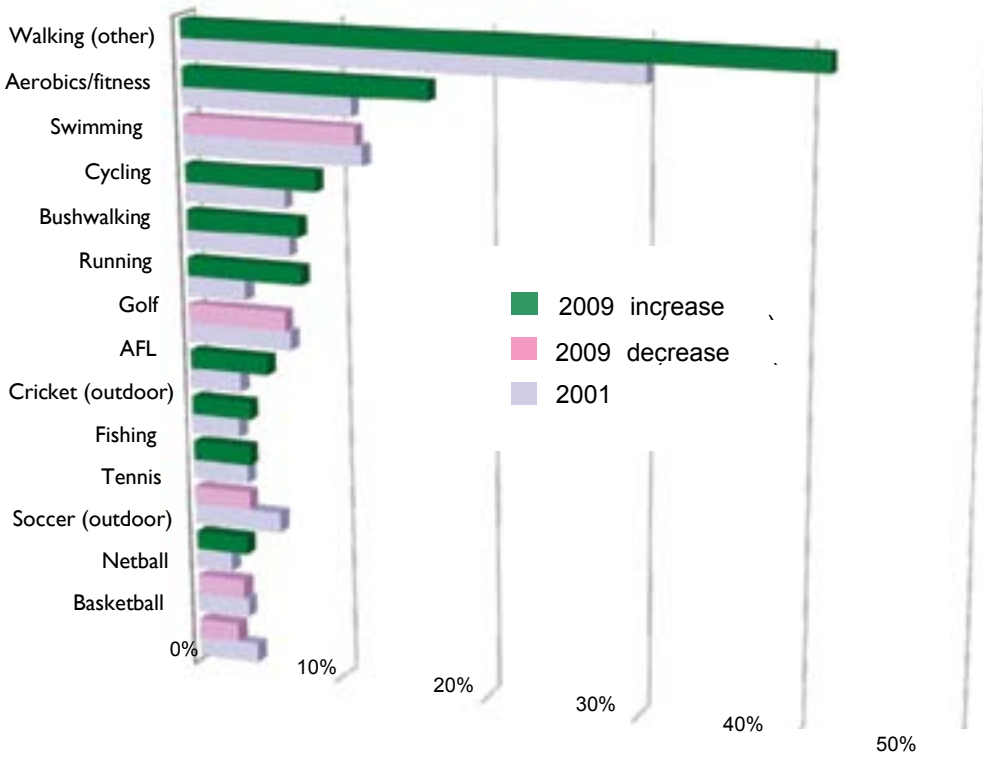
Changes in participation since 2001

In terms of Tasmania's most popular SPR activities for participation,[3] running for SPR had the largest percentile increase in total participation between 2001 and 2009 (100% increase since 2001).

- Other SPR activities to experience large increases in market penetration since 2001 included Australian Rules football (56% increase), outdoor soccer (46% increase), aerobics/fitness (45% increase), walking (37% increase) and cycling (31% increase).
- Activities experiencing declines in participation between 2001 and 2009 included tennis (36% decrease), basketball (34% decrease) and netball (9% decrease).

It should also be noted that ERASS asks respondents to list all of their SPR conduct. Given that people report on average participation in more than two activities, it may be that for many, walking is a core activity that is supported by other, more diverse, forms of SPR.

Figure 2.4 – Tasmanian SPR participation by activity (2001 and 2009)



Culturally significant SPR activities

It is possible to make some observations about the cultural significance of some SPR activities to Tasmanians. This is done by noting the extent to which their local uptake compares to national averages. To that end, sport and physical recreation activities that appeared to resonate with Tasmanians in 2009 included:

Australian Rules football (+89.3%)
fishing (+77.3%)
bushwalking (+54.0%), and
cricket (+25.0%).

Australian Rules football and bushwalking enjoy the highest rates of participation in the nation, with fishing only being more popular in the Northern Territory. Possible explanations for these variances may include climate, SPR heritage, the availability of resources and/or the profile of local teams.

[3]Fourteen SPR activities had a participation rate of greater than 3.5% in either 2001 or 2009.

Regular participation

The Commonwealth Department of Health and Ageing advises that are two different ways of calculating 'sufficient' physical activity for health. These are:

1. the accumulation of a sufficient **amount** of activity over a week
2. the accumulation of a sufficient **amount** of activity by participation in a sufficient **number of sessions** over a week.

The *National Physical Activity Guidelines for Australians* (DHAC, 1999) recommend that to achieve health benefits, a person should participate in 30 minutes of at least moderate-intensity physical activity on most days of the week. For the purposes of calculating 'sufficient' activity, this is interpreted as 30 minutes on at least five days of the week; a total of at least 150 minutes of activity per week. Therefore the two definitions of 'sufficient' above become:

1. the accumulation of at least **150 minutes** of activity over one week; or,
2. the accumulation of at least **150 minutes** of activity and at least **five sessions** of activity over one week (AIHW, 2005).

Recent evidence also suggests that the requisite 150 minutes can be achieved in blocks of activity as short as 10 minutes per session (Murphy, Blair, & Murtagh, 2009).

Although ERASS does not directly assess participation on these terms, we do know that Tasmanians who *regularly* participated in SPR in 2008 did so for a median of 240 minutes per week (compared to a national average of 235 minutes). Occasional participants in Tasmania did so for a median of 120 minutes per week (compared to a national average of 113 minutes). This would suggest that regular participants in SPR are more likely than not to satisfy the first criteria for sufficient physical activity.

Although the second of the National Physical Activity Guidelines (NPAG) criteria—at least five sessions per week—is left unattended by the ERASS cap of three or more sessions per week, the two standards remain compatible.

It is also noted that the Tasmanian regular participation rate of 46.6% is consistent with or lower than the estimates of sufficient physical activity in other NPAG correlated studies (ABS, 2009c; Econtech, 2007a). For this reason, we have adopted the minimum of three days of SPR per week—or regular participation—as a surrogate for sufficient participation. Therefore, where it is relevant to this study, health and related benefits are determined with reference to regular participation. This makes regular participation an important point of reference and worthy of more detailed analysis.

Tasmanian trends in regular participation

As mentioned earlier, an estimated 190 000 Tasmanians aged 15 years and over participated in SPR three times a week or more in 2009, a regular participation rate of 46.6%. This was lower than the national average of 47.7%.

- More females (50.4%) than males (42.6%) were regular participants (Figure 2.5), and this has been the case since Tasmanian specific data was first reported in 2005.
    - Since 2005, regular participation in SPR by Tasmanian males has been lower than the national average; whereas, since 2006, regular participation in SPR by Tasmanian females has been higher than the national average.
    - Regular participation in SPR by females peaked in the youngest age group (ages 15 to 24), and gradually fell away by age. The exception was the group aged 25–34, which had the lowest rate of regular participation.
    - Regular participation by males also peaked in the youngest group and plummeted in young adults. Unlike regular female participation, however, regular participation by males steadily increased with age.

- The regular participation rate increased between 2005 and 2009 for both males and females, despite a marked downturn in the last 12 months (Figure 2.6).
    - In 2005, the regular participation rate among males was 40.9%; this increased to 42.6% in 2009.
    - In 2005, the regular participation rate among females was 44.6%; this increased to 50.4% in 2009.
- The increase in the regular participation over time is consistent with national trends, which are largely explained by an increase in participation in non-organised SPR.
    - Regular participation in non-organised SPR has increased dramatically between 2001 (27.9%) and 2009 (38.9%).
    - Regular participation in organised SPR has increased to a lesser extent between 2001 (9.3%) and 2009 (12.4%).
    - Organised SPR is defined here as physical activity for exercise, recreation or sport that was organised in full or in part by a fitness, leisure or indoor sports centre that required payment for participation; a sport or recreation club or association that required payment of membership, fees or registration; a workplace; a school; or any other type of organisation (ASC, 2010).

Figure 2.5 – Regular participation in SPR by age and gender in Tasmania (2009)

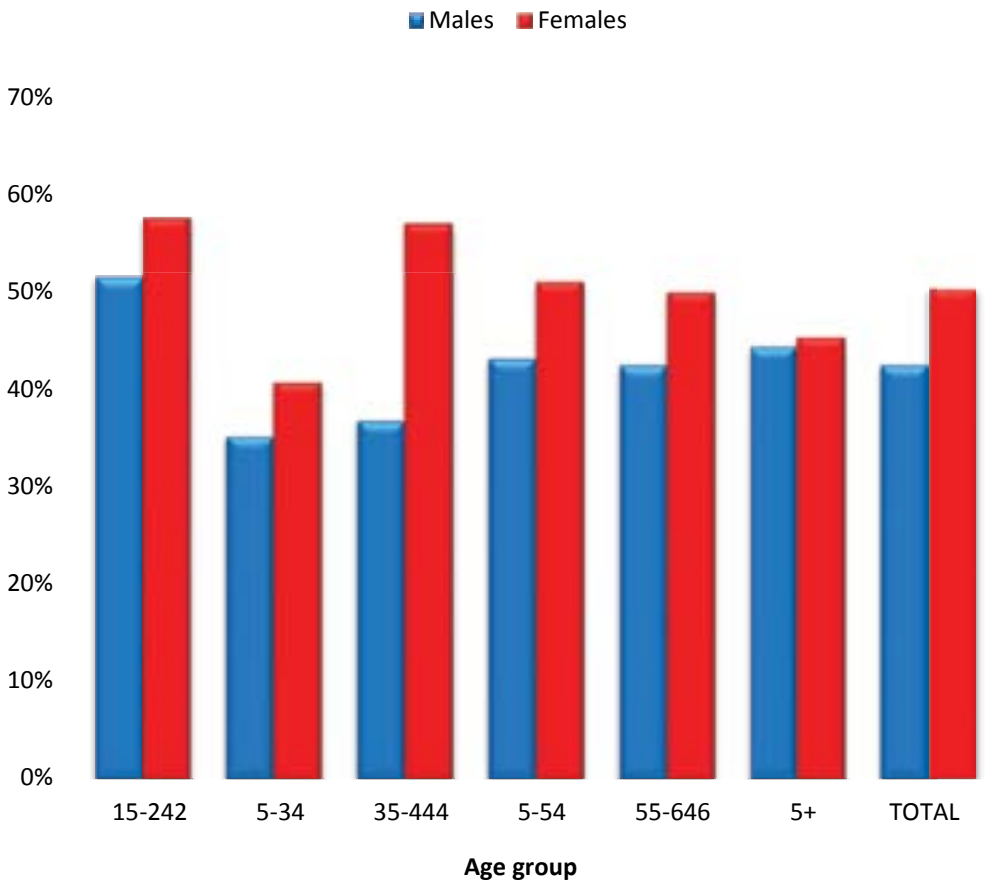
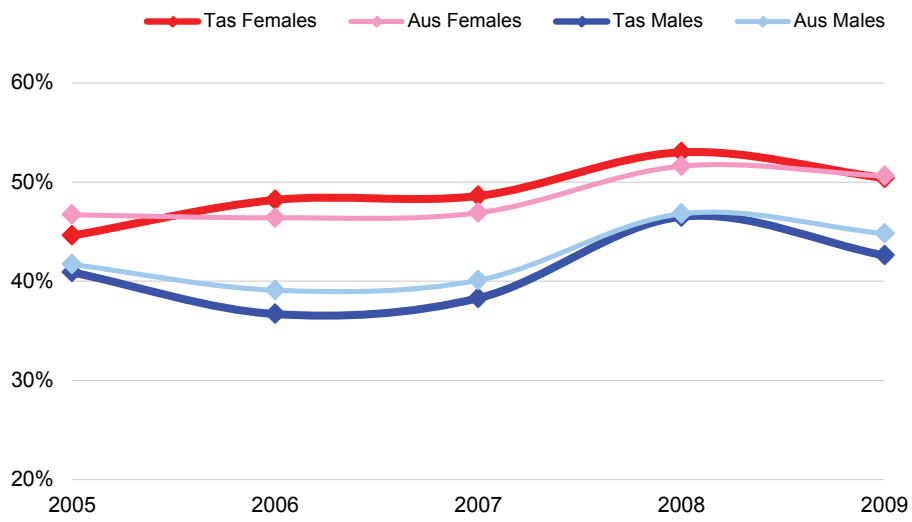


Figure 2.6 – Regular participation in SPR by gender (2005-09)



At-risk populations

Although the lower rates of junior participation in organised sport may be off-set by higher rates of participation in informal activities, such as bike riding, this substitution is likely to be imperfect and of concern. For adults, there has also been a decline in both regular participation and median hours of participation in the last 12 months. This may be a plateau after 10 successive years of growth. Tasmania also has a greater number of adult occasional and non-participants in SPR than the national average, which represents a challenge for the community.

If regular participation, as it is defined here, is accepted as the threshold at which the benefits of SPR participation significantly accrue, it is also worth highlighting populations that are under-performing in this regard. These include:

- males
    - This is especially true of the 25–34 age cohort, a population often assumed to be highly active.
- people with children under 18 years of age, especially if the children are not living at home
- people who have not gone on to post-secondary education
- people who are in full-time employment.

There is no difference in regular participation between Hobart and the rest of the state, nor does marital status appear to influence results.

Indigenous participation in Tasmania has historically been lower than non-indigenous participation by as much as seven percentage points. Reported again for the first time since 2007, it is now higher than non-indigenous participation (50.4% to 46.4%).

Participation in SPR volunteering

The ABS, on whose research we rely here, defines a volunteer as someone who, in the 12 months prior to survey, willingly gave unpaid help in the form of time, service or skills, through an organisation or group (ABS, 2007). This report therefore distinguishes volunteers from the informal, unpaid help or care that people provide in the context of SPR, for example by transporting a family member to and from activities.

It is estimated that over **36 500** Tasmanians aged 15 years and over volunteered over **three million hours** for sport and physical recreation in 2008-09. This was the equivalent of **1 791 full-time jobs** in the community. Interestingly, approximately one in eleven Tasmanians aged 15 years and over is involved in SPR as a volunteer.

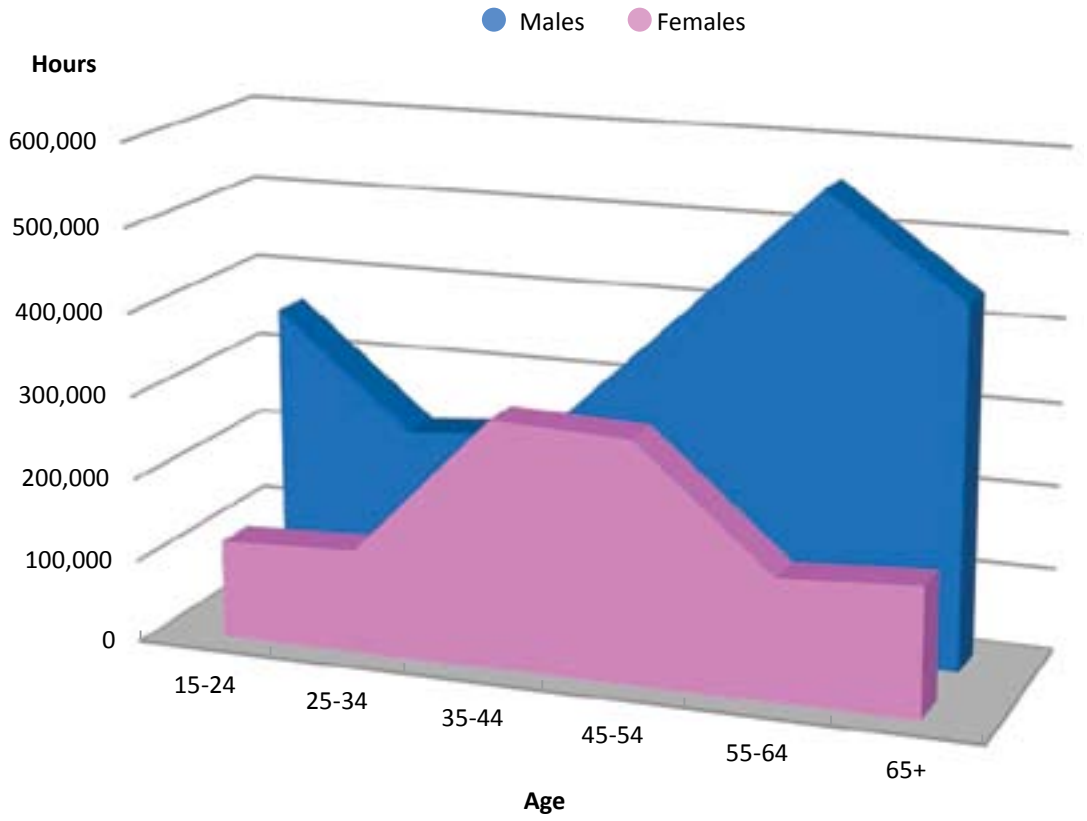
- Males collectively volunteered for SPR at just under one-and-a-half times the rate of females.
- For males, the cohort aged 15–24 had the highest rate of SPR volunteering (15.9%), followed by males aged 55–64 (12.3%).
    - Although those males aged over 65 had the lowest rate of participation (6.0%), they contributed an average of 4.0 hours per week, the highest volume recorded. Males aged 35–44 had the lowest volume of participation, at 1.2 hours per week.
    - Males aged 55–64 contributed, on a population pro-rata basis, the greatest number of hours to SPR volunteering in the year (over 550 000 hours). Males aged 35–44 volunteered the least, contributing less than 240 000 hours.
- For females, the cohort aged 35–44 had the highest rate of SPR volunteering (11.1%), followed by females aged 45–54 (10.7%). The group aged 35–44 was also the largest contributor of volunteer hours, with nearly 300 000 hours donated.
    - As with males, although females aged over 65 had the lowest rate of participation (3.1%) they contributed an average of 2.3 hours per week, the highest volume recorded. Despite their high rate of participation, females aged 25–34 had the lowest volume of participation, at 1.2 hours per week.

The ABS has separately observed that just over one-quarter of all Tasmanians aged over 15 years are 'involved'[4] with organised sport and physical recreation. Over 50% of regular SPR volunteers also held a full-time job, whereas this was true for less than one-third of volunteers in other organisations. Tasmanian SPR volunteers also came from all walks of life, with roughly the same representation from each socio-economic quintile (ABS, 2008b).

Nearly one-half of all regular SPR volunteers in Tasmania were actively involved in another community group, particularly education and training, and health promotion and support organisations. Over one-quarter of Tasmanian SPR volunteers were additionally involved in governance or citizenship groups, such as trade unions or professional associations (ABS, 2008b).

[4] As a player or non-playing facilitator (volunteer).

Figure 2.7 – SPR volunteering in Tasmania (2008-09)



Given the way the source data is reported, it is only possible to make assumptions about SPR volunteering in Tasmania if it is supposed to be consistent with national trends. If that is granted, however, then males aged 25–34 can be seen to be less committed to SPR volunteering than their peers. This cannot be explained by a higher rate of regular participation among that group, as they too are significantly under-represented.

Male volunteering in SPR overall is consistently higher than that of females. Were it not for the demographic contribution of 'soccer mums' this disparity might be perceived as being critical; however, overall community volunteering for females outstrips that of males, so there exists an opportunity for SPR providers to exploit this under-realised potential by making their volunteering opportunities more female-friendly.

3. Costs of SPR

Current costs

The term 'current costs' is used here to describe the recurrent expenditure on SPR in Tasmania in 2008-09. The sum of current costs is also an estimate of the change in final demand related to SPR in the financial year, as these are the costs borne by households, business and government in the support of SPR. To avoid double counts, intermediate inputs such as the costs of production are incorporated, and not counted separately. In other words, the costs of manufacturing a sports shoe, for example, are assumed in the final (household) purchase price. Similarly, the equipment, labour and utility overheads of a gymnasium operator are assumed to be fully recovered by subscription and other income.

Although previous Australian estimates of recurrent expenditure on SPR have relied on Australian and New Zealand Standard Industrial Classification (ANZSIC) data, we apply a new and more rigorous method that uses household expenditure and source data from business and government to develop an SPR-specific satellite account framework. This avoids counting non-physical recreation (such as casino gambling) in our estimates, and captures previously unconsidered data from, among other categories, the retail, education and transport sectors.

In 2008-09, the post-tax expenditure of Tasmanian households on SPR was estimated to be $491.9 million, or 5.2% of all household spending. The three tiers of government contributed a further $103.6 million. The state government directly spent $8.0 million on its SPR agency, Sport and Recreation Tasmania (SRT). We were also able to identify $62.6 million of expenditure on SPR by other state government departments—the combined total of $70.7 million represented less than 1.8% of the state's total outgoings. Although only $3.0 million of federal government expenditure on SPR in Tasmania could be located, significant capital contributions to SPR in the period were noted. These are considered in the subsequent discussion of opportunity costs.

Tasmanian businesses were estimated to spend $17.6 million on SPR above and beyond their operating expenses. This figure is likely to be an under-estimate as we were unable to reliably quantify the extent of SPR-related expenditure on employee wellbeing.

Figure 3.1 – Current costs as a precedent to SPR

Household expenditure on SPR

Australian and New Zealand Standard Industrial Classification (ANZSIC) has been developed for use in both countries for the production and analysis of industry statistics (ABS, 1993). 'Subdivision 93: Sport and Recreation' is the most commonly used to describe the economic impact of SPR; however, it also contains data on horse and dog racing (which is bureaucratically distinct), casinos, lotteries and other non-physical leisure activities.

The widely relied upon 8686.0 Sport and Physical Recreation Services, Australia (ABS, 2009b) interrogates the two relevant categories within 'Subdivision 93 – 9312: Sports Grounds and Facilities not elsewhere classified' and ' 9319: Sports and Services to Sports not elsewhere classified'. The title of this report is misleading, as physical recreation is neither defined nor separately considered. Similarly, a number of items fundamental to SPR metrics (such as the purchase of bicycles) are out of the scope of even the parent 'Category P: Culture and Recreation Services' and are excluded from accounting.
The Australian Bureau of Statistics (ABS) recognises this problem, and has previously argued for the development of a Sport and Physical Recreation satellite account.

> An SPR satellite account should enable the systematic analysis over time of aggregate national expenditure on SPR activities, the composition of that expenditure and its direct contribution to gross value added and GDP for the whole economy (ABS, 2004).

Although the development of a formal SPR satellite account remains unfunded in this country, the analysis of this report follows approaches developed by the ABS and international discussion papers in this regard (ABS, 2004; Sport Scotland, 2007). To estimate household expenditure on SPR, we utilise the ABS's Household Expenditure Survey (HES) industry and product classifications. Although, the classifications used in the HES generally conform to the ANZSIC framework, they provide a level of detail not otherwise available.

The most recent HES was completed for the financial year 2003-04. Average weekly expenditure on over 600 goods and services has been obtained from this survey and interrogated for their relationship to sport and physical recreation (ABS, 2006a). From this, it is possible to arrive at a gross estimate of Tasmanian household income spent on SPR. The final figure shown for each category is per household weekly expenditure, indexed to 2008-9 prices (ABS, 2010a), times the 207 911 households in Tasmania (ABS, 2010b), times 52 weeks (Table 3.1).

In some instances it has been necessary to estimate the extent to which each category is impacted by sport and physical recreation. The rationale for these estimates is made at Appendix 1. A precise estimate of household expenditure on SPR injury is made separately at Appendix 2. It should also be noted that changes to lifestyle since 2003-04 are another factor not considered by this method. One such impact may be the increased consumption of physically contingent computer games by Tasmanians. For example, the rapid uptake of the Nintendo Wii (SPR) gaming system may have had an influence on household spending in this domain. Categorical (unweighted) effects of inflation and less significant SPR attributions to domestic expenses are also not factored. These are recommended as directions for future research.

Table 3.1 – Tasmanian household expenditure on SPR (2008-09)

Expense	% SPR	per household per week	Tas Total per year ($'m)
SPR fees and charges	100.0%	$7.12	$77.0
SPR equipment	100.0%	$5.91	$63.9
SPR clothing and footwear	100.0%	$2.75	$29.7
TAB - betting (excluding animal racing)	100.0%	$0.03	$0.3
Animal expenses	50.0%	$4.43	$47.9
Holidays, day trips and other excursions	29.1%	$9.10	$98.4
Child care services	25.0%	$0.61	$6.6
Cash gifts and donations	12.0%	$0.28	$3.0
Media	11.1%	$3.98	$43.0
Food and beverage	5.6%	$3.68	$39.8
Transport	5.0%	$7.35	$79.5
Education fees for primary and secondary schools	3.7%	$0.27	$2.9
Medical care and health expenses	0.1%	$0.01	$0.1
		$45.50	$491.9

Government expenditure on SPR

In the method applied above, household expenditure only references earnings after tax. The component of taxation revenue that is allocated to sport and physical recreation is another cost that can be reliably defined.

In assessing the sum of government SPR expenditure in Tasmania, we have separated the spending activities of the three tiers. The primary agency for the support of SPR in the state is Sport and Recreation Tasmania (SRT), the state government body who commissioned this report; however, there is also significant SPR spending that is observable outside their traditional jurisdiction. In Tasmania, the Department of Education, for example, delivers SPR programs and manages SPR assets, as do the Departments of Justice (Corrections) and Economic Development, Tourism and the Arts. Certain Government Business Enterprises, such as the Inland Fisheries Service and Marine and Safety Tasmania similarly enable sport and physical recreation. A full accounting of state government expenditure on SPR, with a detailed list of sources and attribution methods, can be found at *Appendix 3*.

At the local government level, SPR is rarely accounted for as a distinct activity. For example, the maintenance of sports ovals may be the responsibility of Asset Services, whereas the funding of local sports clubs is accommodated by the broader category of Community Services. For that reason, we undertook a census of all Tasmanian councils, asking for a best estimate of SPR income, expenditure and asset value (see *Opportunity cost*). The response rate from councils of 74% was excellent, and from this we were able to infer a whole of local government expenditure by applying a population *pro rata* (ABS, 2006b).

Our research also found that the Tasmanian SPR sector receives very little in the way of federal funding for operational activities—see *Appendix 3*. Nevertheless, it should be noted that capital expenditure programs, such as the Building the Education Revolution scheme, have directly enabled SPR infrastructure enlargement within the state. The cost of these activities, however, is capitalised and considered in the later discussion of *Opportunity cost*; in other words, they do not meet our definition of current costs.

Table 3.2 – Whole-of-government expenditure on SPR in Tasmania (2008-09)

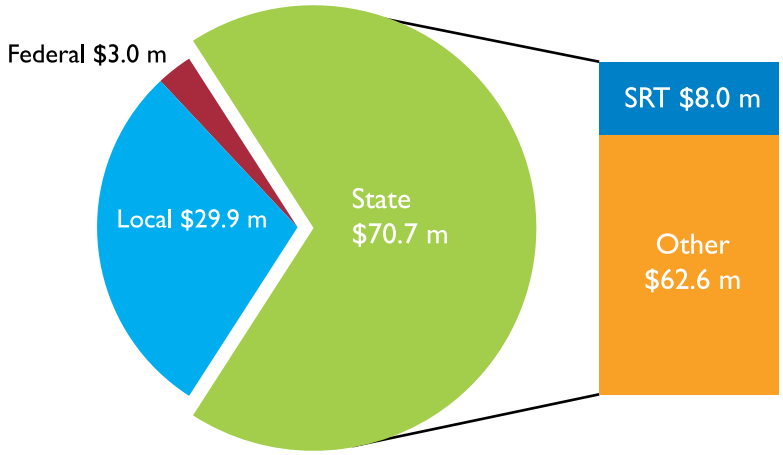
		Total ($m)
Local		$29.9
State	Sport and Recreation Tasmania	$8.0
	Other	$62.6
Federal		$3.0
		$106.4

It is noted that the agency assumed to have primacy over sport and recreation in the state, Sport and Recreation Tasmania, actually funds less than 10% of all of government SPR activity.

The contribution of local government, although split over 29 administrative bodies, is significant—especially when it is observed that local government administers nearly $820 million-worth of dedicated SPR infrastructure (see *Opportunity cost*).

The popular, if anecdotal, perception that local government is the biggest investor in the delivery of SPR is upset, however, by the revelation of the extent of 'hidden' state government expenditure. Either way, a significant strategic challenge for public policy exists if SPR resources and knowledge are to be optimally distributed.

Figure 3.2 – Government expenditure (current costs) on SPR in Tasmania (2008-09)



Business expenditure on SPR

The expenditure of SPR businesses on their own (intermediate) resourcing of goods and services is captured by our previous estimates of household and government estimates of final demand. This is because consumption, not production, is the unit of input for analysis. However, there are two known varieties of SPR-related expenditure by businesses that do impact above and beyond this.

The first of these is the non-saleable provision of SPR goods and services directly to employees, usually under the rubric of employee wellbeing. Expenditure in this regard may be on items such as gym memberships, golfing 'conferences' and the like. Unfortunately, there is no systematic and reliable research into the extent of such expenditure, meaning that we cannot count it in our assessment of costs. Note that this has the conservative effect of underestimating the total economic impact of SPR.

The second known business impact on final demand is the sum of expenditure on SPR sponsorship. Because the receipt of these monies by SPR producers effectively subsidises the cost of goods and services to households, the expenditure by Tasmanian businesses on SPR sponsorship is an economic event of significance to this study. Unlike discrete spending on SPR-related employee wellbeing, however, it is possible to (somewhat crudely) estimate a total corporate spend on Tasmanian SPR.

In 2004-05, Australian SPR providers reported receiving 9.1% of their operating income from sponsorship and fundraising (ABS, 2009b). In 2008-09 terms, this would equate to $20.6 million to Tasmanian operators. When this amount is discounted by the amount donated by households (reported in Table 3.1 to be $3.0 million), we can conclude that the sum of business sponsorship is approximately **$17.6 million.**[5]

The earlier *Generosity of Australian Business (2000-01)* survey considered the same issue, albeit from the opposite perspective, reporting what business donated directly to SPR (as opposed to what SPR received from businesses) (ABS, 2002). When appropriately indexed and distributed to Tasmania, the sum of business sponsorship was estimated by this method to be $17.9 million, confirming the reliability of estimate.

Opportunity costs

An opportunity cost is the value lost (or forgone) as a result of making a decision between mutually exclusive choices. Thus, before assessing the economic benefits of sport and physical recreation, it is useful to consider what we might have gained by electing to use the capital resources we currently employ in SPR to their 'next best' ends. In order to resolve the opportunity cost conundrum, we radically suppose that there is no SPR in Tasmania, and that the assets presently devoted to it are put to alternate productive ends.

Sport and physical recreation is known to be a capital intensive activity. In other words, its performance consumes a disproportionately high volume of land and infrastructure. Perhaps because of this, a significant number of SPR assets are publicly held.

Valuable human capital is also expended in the pursuit of SPR. This is best understood in terms of the hours that people dedicate to either participating or volunteering in the activity.

The opportunity cost of these human and infrastructural resource allocations can be measured by identifying the potential value in dollar terms of an alternative allocation. For hours spent participating or volunteering, we use the average after-tax wage (based on age). For land and infrastructure, we have made an estimate of the assets allocated to support SPR by public authorities.

The effective labour cost of SPR in Tasmania in 2008-09 is estimated to be $646.6 million. Of this, $609.9 million is the cost of participation and $36.7 million is the opportunity cost to volunteers. The opportunity lost through the public ownership of SPR assets is $30.6 million. The total cost of the opportunity lost to SPR in Tasmania in 2008-09 is therefore estimated to be **$677.2 million.**

[5] The tendency for businesses to support elite sport, and the under-representation of elite sport in Tasmania, means that this figure may well be an overestimate.

Figure 3.3 – Opportunity and current costs as a precedent to SPR

Opportunity costs of participation

The opportunity cost—or deemed value—of SPR participation is estimated using the average weekly earnings for part-time and full-time workers for each age group, less a 35% marginal rate of tax (Warburton & Hendy, 2006a). The hourly rate is also weighted to reflect the composition of the Tasmanian work-force at each interval; in other words, by the percentage of full-time, part-time and non-participants per age-group. Appendix 4 details the method and sources used to calculate the opportunity cost.

This approach applies a simple leisure/work trade-off model that identifies the opportunity cost of one hour of leisure by the income that could have been earned by working for an extra hour. This is consistent with a flexible labour model and assumes that additional work opportunity is available. As one would expect, the opportunity cost of leisure is low for the very young or very old, but quite high for those in higher earning age groups. This may be a psychological barrier to participation in these groups, although further qualitative study would be required to verify this.

Table 3.3 uses the participation rate for all users, both regular and occasional, as this aligns with the data on median hours of participation. It shows that in Tasmania in 2008-09 there were nearly 60 million hours donated to sport and physical recreation participation, at an opportunity cost to participants of **$609.9 million.**

Table 3.3 – Opportunity cost of SPR participation in Tasmania (2008-09)

Males	Tas Pop	Rate	Median hrs/week	Hours/year (m)	Opp cost ($/hr)	Total cost ($m)
15-24	33783	84.7%	4.1	6.1	$6.12	$37.6
25-34	28092	92.1%	3.0	4.0	$13.67	$55.2
35-44	32507	85.3%	3.0	4.3	$16.45	$71.1
45-54	36175	82.6%	3.2	4.9	$16.72	$82.3
55-64	32179	78.0%	5.5	7.2$	11.14	$80.0
65+	35084	71.9%	4.5	5.9	$1.56	$9.2
				32.5		$335.4
Females						
15-24	32068	92.9%	2.5	3.9	$6.12	$23.7
25-34	28962	81.6%	2.0	2.5	$13.67	$33.6
35-44	34243	86.5%	3.0	4.6	$16.45	$76.0
45-54	37306	82.4%	3.3	5.2	$16.72	$86.9
55-64	32832	76.7%	3.3	4.3$	11.14	$47.4
65+	41817	67.4%	3.0	4.4	$1.56	$6.9
				26.3		$274.5
				58.5		$609.9

Opportunity costs of volunteering

The same method can be used to calculate the cost of hours diverted by individuals into SPR volunteering. Table 3.4 uses the previously cited data to illustrate the cumulative hours of SPR volunteering in Tasmania. Applying these rates to the known opportunity costs allows us to infer that in Tasmania in 2008-09 there were over three million hours donated to sport and physical recreation volunteering, at an opportunity cost to volunteers of **$36.8 million.**

Table 3.4 – Opportunity cost of SPR volunteering in Tasmania (2008-09)

Males	Tas Pop	Rate	Median hrs/week	Hours/year (m)	Opp cost ($/hr)	Total cost ($m)
15-24	33783	15.9%	1.3	0.4	$6.12	$2.2
25-34	28092	11.0%1	.4	0.2	$13.67	$3.1
35-44	32507	11.7%1	.2	0.2	$16.45	$3.9
45-54	36175	11.7%1	.8	0.4	$16.72	$6.6
55-64	32179	12.3%	2.7	0.6$	11.14	$6.2
65+	35084	6.0%	4.0	0.4	$1.56	$0.7
				2.2		$22.7
Females						
15-24	32068	4.7%	1.5	0.1	$6.12	$0.7
25-34	28962	6.9%	1.2	0.1	$13.67	$1.7
35-44	34243	11.1%1	.5	0.3	$16.45	$4.9
45-54	37306	10.7%	1.4	0.3	$16.72	$4.9
55-64	32832	4.1%	2.1	0.1$	11.14	$1.6
65+	41817	3.1%	2.3	0.2	$1.56	$0.1
				1.1		$14.0
				3.3		$36.8

Value of SPR infrastructure

Public ownership of SPR resources prevents them being used for alternative endeavours. And although their upkeep has been considered in the discussion of *Current costs,* it could be argued that their ownership incurs an opportunity cost above and beyond that which is borne in the accounts of income and expenditure. A fair estimate of the displaced loss on SPR infrastructure is therefore important to any holistic reckoning of costs and benefits.

It should be noted this report presumes that privately held SPR assets—being subject to the whim of consumer market forces—profit or perish. Theoretically at least, they are automatically displaced when the 'next best' option becomes viable. For that reason, they are not considered in this reckoning.

The approach taken to the valuation of assets follows the revealed preference method. There are significant landholdings associated with sport and physical recreation in Tasmania. These include playing fields at schools, sporting centres, parks and other areas reserved for recreational activity. Although it may be possible to apportion land between alternative uses (for example, some land may be important for both the preservation of natural heritage and enabling SPR), we prefer not to do so because in the alternative case, where these services are not funded, significant SPR resources would be entirely denied to the community.

The method for calculating infrastructure costs therefore involves determining the value of assets associated with SPR activities, primarily by apportioning the value of land and building assets of government departments with functions relating to SPR. In other words, the total book value of an agency's assets is discounted by the extent to which its activities are related to SPR. A detailed explanation of our method and rationale can be found at *Appendix 5*.

An assumption is then made with respect to the opportunity cost of capital associated with the assets. For example, if a playing field associated with a school was sold because no value was placed on sporting activity by policy decision makers and the community, then the value of land could be used to reduce gross government borrowing—our supposed next best alternative use. Therefore the value of the asset for sport to society is at least equal to the interest payment on the assets.

$$\text{Asset value of SPR} = \sum_{i} Ai \times Pi \times r$$

Ai = assets of entity (department i)
Pi = percentage of assets relating to SPR (department i)
r = rate of return on assets (government borrowing rate)

The perpetual value of capital makes it more appropriate to use the most current figures available, instead of 2008-09 estimates. Therefore, the rate of return is determined from the 10 year bond rate of 5.1%, as at 1 July 2010. An estimate of 3.1% is further identified as the long-run inflation rate, based on the final year projection of the percentage change in Hobart Consumer Price Index (June 2010).

$$r = i - \pi$$

r = real discount rate (or cost of capital)
i = nominal long-run interest rate (5.1%)
π = long-run inflation forecast (3.1%).

The long-run cost of capital thus applied is 2.0%. Table 3.5 details the distribution of state-owned SPR assets by sector, and the rate of return that those assets might otherwise enjoy (their opportunity cost).

Table 3.5 – Whole-of-government SPR assets in Tasmania (2008-09)

		Total ($m)	Cost ($m)
Local		$819.1	$16.4
State	Sport and Recreation Tasmania	$31.0	$0.6
	Other	$758.4	$15.2
		$ 1 608.6	**$32.2**

We were unable to identify any federally owned SPR capital in Tasmania. The preferred model for federal support of SPR assets in this state currently appears to be by capital expenditure grants, such as those provided by the 'Building the Education Revolution' program, which are then administered by either state or local government, or private SPR agency. Ownership of the asset is then retained by the administering agency.

Therefore, the long-run cost of publically owned SPR capital in Tasmania is estimated to be **$32.2 million**.

Privately held SPR assets are not included here as it is assumed that in competitive markets they are optimally employed.

4. SPR capital

Academic theory is replete with models that purport to illustrate different aspects and interpretations of capital. The following list is by no means an exhaustive catalogue of the varieties discussed today:

- Cultural capital
- Economic capital
- Human capital
- Instructional capital
- Intellectual capital
- Knowledge capital
- Natural capital
- Psychological capital
- Social capital
- Symbolic capital

Given that there appears to be a capital for all occasions—and that very few of these are entirely discrete—what potential is there for SPR to stake its own claim in this regard?

'Capital' refers to the wealth stored in an entity that can be either drawn down or employed in perpetuity. Thus, economic capital is the sum of wealth created by an economy, natural capital is that found in an ecosystem, intellectual capital is the wealth embedded in ideas, and so forth.

SPR capital would therefore allude to any wealth or capacity that is attributable to sport and physical recreation. And, although there is nothing to preclude its measurement relying on one or more of the other forms of capital established in the literature, for SPR capital to be distinct it must identify a unique suite of outcomes (as moderated by costs) or value.

Furthermore, capital – on its own – is not productive. For SPR to realise the potential of the value that is stored within it, that capital must be employed. SPR capital is also a non-fungible attribute that accrues discretely within individuals. It is only when citizens collectively express their SPR capital that its effect can be quantified and reconciled with costs to arrive at estimates of value. Importantly, that capital can be used positively (for example to improve the health of a participant) or negatively (for example to justify acts of vilification on the basis of SPR team membership (Long & McNamee, 2004)).

SPR capital therefore lies at the nexus between inputs (costs) and outputs. Economic expressions of SPR capital will be unique to each society, even though the potential—for good or bad—within SPR capital is theoretically uniform.

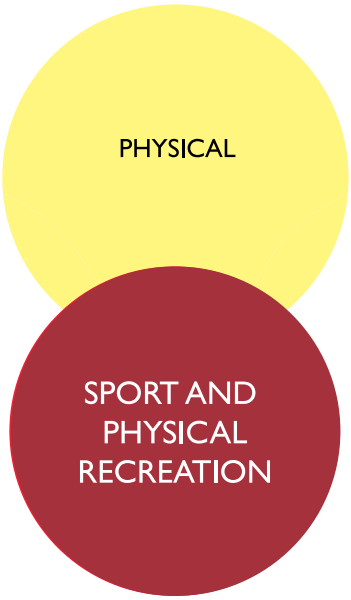
The discussion that follows connects already defined expressions of capital in the context of SPR. It does so by interrogating the literature on SPR, isolating discrete references to value, and illustrating the way in which they relate to both the discipline of SPR and to each other.

Physical capital

Physical SPR capital is defined here as the embodiment of the health, wellbeing, cognitive and other physical benefits (including for example, stamina, dexterity and erotic capital) that would ordinarily ensue from participation in sport or physical recreation. Though referred to here as physical capital, the concept extends Bourdieu's (1986) primarily aesthetic value of appearance to include intrinsic measures of capacity such as fitness and cognitive accretion. As an intrinsic, human value, this iteration of 'physical capital' should not be confused with alternate economic uses of the phrase, describing infrastructure and the like.

It is not the place of this report to rehearse the arguments for the physical benefits of SPR. Even a cursory scan of the academic and popular literature on the topic will inundate the reader with evidence that SPR (or more specifically, engaging in physical activity—a necessary attribute of SPR) will do everything from making an individual smarter (Etnier et al., 1997) to improving their sex life (Ozbek et al., 2008) and preventing cancer (Cottreau, Ness, & Kriska, 2000). The argument is generally qualified by the expectation that the greater the intensity and frequency of activity, the more likely the reported (positive) outcome (Farrell & Shields, 2004).

Similarly, the relationship between physical capital as defined here and the productive capacity of the individual is now considered to be causally inarguable. In the first instance, there is a clear link between levels of physical activity and cognitive performance across all age groups (Bailey, 2006; Fox, 1999; Mechling, 2005). Other manifest industrial outcomes include reductions in workplace absenteeism, occupational injuries and employee turnover (Lloyd & Foster, 2006; Shephard, 1986). Perceived productivity and job satisfaction are also significantly correlated to an employee's physical capacity (Wattles & Harris, 2003). Therefore, if SPR has the potential to enlarge a person's physical capital, which in turn can act as a catalyst for more commercially productive behaviour, it is entirely plausible to allege that SPR has the potential to act as catalyst for profit in any organisation.

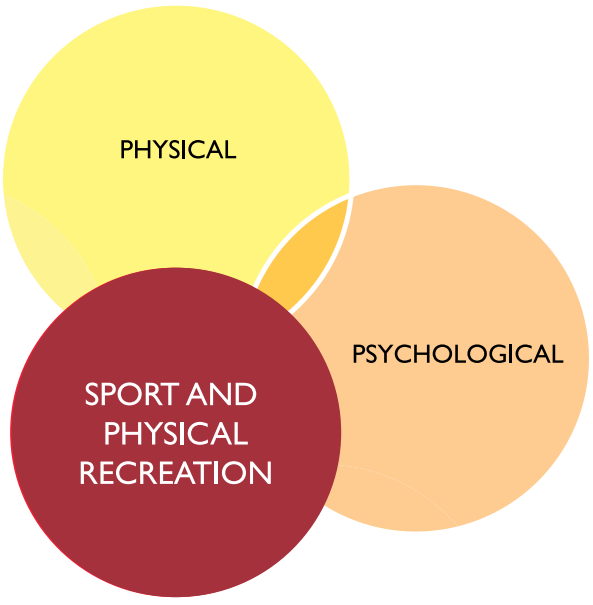


Psychological capital

Psychological capital is a recent construct arguing that the states (as opposed to dispositional traits) of self-efficacy, hope, optimism and resilience can be amassed in the individual and converted into commercial gain (Luthans, Avolio, & Youseff, 2007). The exploratory work on psychological capital done thus far suggests that in positive iterations it can enhance workplace performance, individual commitment and satisfaction, and—as a contagion—effect constructive organisational change (Luthans & Youssef, 2004). The work of Luthans and colleagues, however, has been confined to linking positive organisational climate with psychological capital, and as yet has not investigated its place in external sources.

Despite the sporting literature failing to attend as yet to this theoretical development, there is strong prima facie congruence between competitive sport and the nurture of psychological capital. One highly esteemed value of sport is courage (Birrell, 1981). This, it could be argued, is the active expression of, among other things, self-efficacy, hope, optimism and resilience (Bournes, 2000). In fact, researchers have identified the discrete links between participation in sport and self-efficacy (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Valois, Umstattd, Zullig, & Paxton, 2008), optimism (Kavussanu & McAuley, 1995) and resilience (Demaine & Short, 2007), although the limits of research design have, in the main, prevented the definitive attribution of causality to sport. Interestingly, the psychological state of hope is more frequently related to sports consumption (O'Reilly, Kaplan, Rahinel, & Nadeau, 2008; Radford, 2005), suggesting that there is potential in sport for psychological capital building beyond the four corners of the playing field.

There is an additional case to be made for trust, which is also an aspect of social capital, to be included as a dimension of the psychological capital framework (Page & Donohue, 2004). Similarly, one cannot avoid the intuitive intersection of psychological capital with physical capital's impact on cognition. Thus it is already apparent that despite the definable nature of the individual capitals, they are not necessarily independent outcomes of SPR.

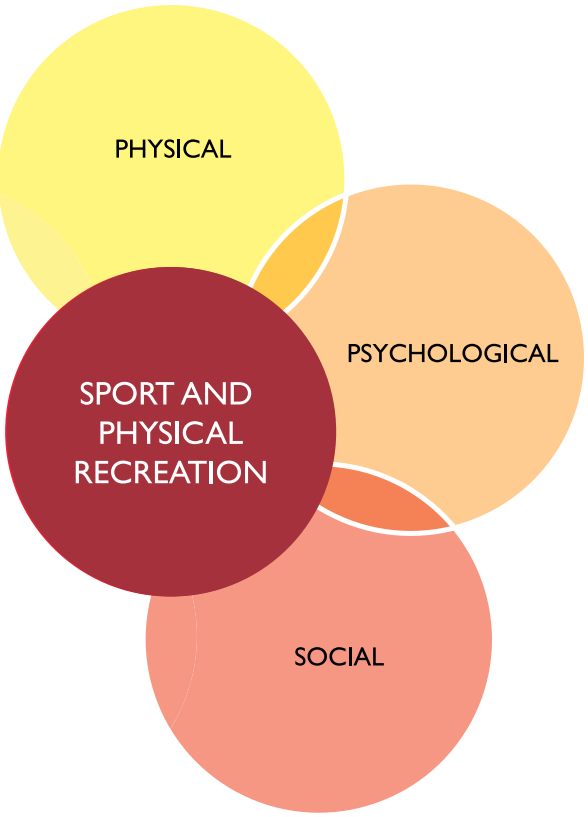


Social capital

Social capital is defined by the OECD as 'the norms and social relations embedded in the social structures of societies that enable people to co-ordinate action to achieve desired goals' (Grootaert, 1998). Although there remains an inconsistent understanding of its merits, it is conceptually embedded in the SPR literature (Atherley, 2006; Coalter, 2007). Both qualitative and quantitative instruments used to measure social capital generally cluster their enquiry into the measurement and operationalisation of trust, happiness, inter-personal networks and civic engagement (Dudwick, Kuehnast, Jones, & Woolcock, 2006; Grootaert & Basterlaer, 2002; Putnam, 2002). The literature supports the view that these are the main independent determinants of social capital.

Global social surveys have found that those who actively participate in sporting organisations have stronger associations with these conditions than those who do not (ISSP, 2001; Perks, 2007; Seippel, 2006), especially amongst (facilitative) volunteers (Harvey, Levesque, & Donnelly, 2007). There is also a broad base of evidence that social capital is a positive contributor to individual (Narayan & Princhett, 1997), organisational (Sabatini, 2005) and community yield (Woodhouse, 2006; Woolcock, 1998). The literature is equally conclusive that social capital is not a default outcome of SPR participation—as it has been so eloquently pointed out, a person who regularly bowls alone, for example, is participating in a sport absent of any social capital creation (Putnam, 1995, 2000). Furthermore, the operationalisation of social capital in the SPR context is not always to the benefit of the community (Begg, Langley, Moffitt, & Marshall, 1996; Kamberidou & Patsadaras, 2007).

If it is accepted that social capital has the potential to enlarge the wealth and wellbeing of communities—and that SPR is a valuable source of the same—then the catalytic potential of SPR in this regard is significant to any holistic conceptualisation of value.



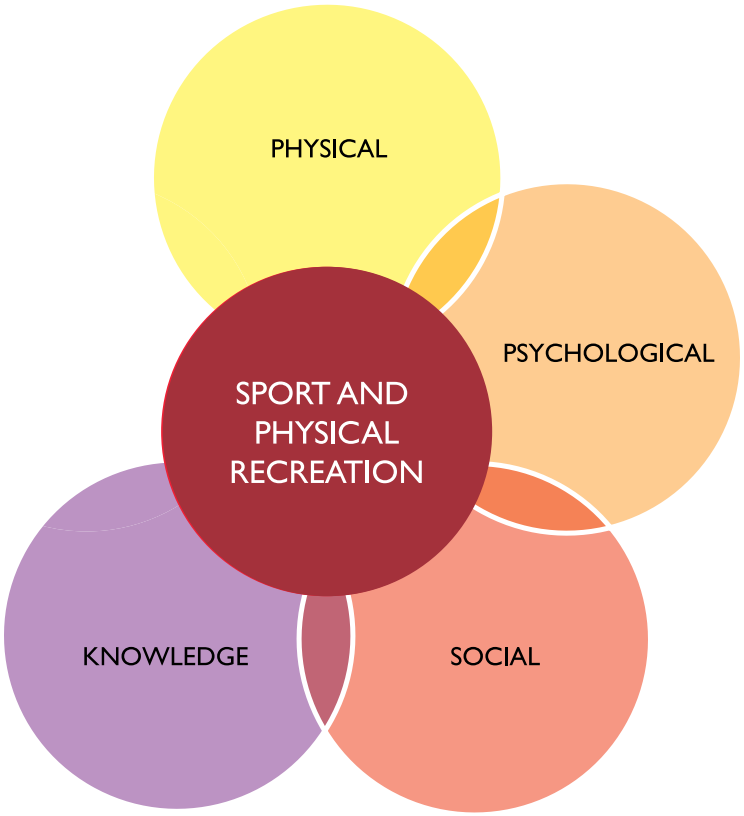
Knowledge capital

Knowledge capital is also sub-divisible, in this case into two forms: technological and experiential (Hiser, 1998). As a catalytic variety of capital, the technological or experiential knowledge acquired through SPR is transferable to enterprise. It is argued here that the skills training afforded by sport, especially for those in facilitative roles, is a form of technological knowledge. For a volunteer, this might mean that acting as a sports club treasurer will equip them with skills that will make them more efficient in their employment as a tradesperson. SPR exposure to teamwork and leadership enlarges an applicable body of experiential knowledge in an individual that will inevitably realise commercial gain (Keogh, Mulvie, & Cooper, 2005).

Other studies also link watching and discussing sport with positive morale in the workplace and higher levels self-esteem (Hudson, 2006). A person's store of sporting lore is often used to improve their worth to others. In enterprise, for example, it may mean that the salesperson who can critically discuss the weekend's match is, in certain circumstances, more likely to close the deal than their less literate contemporary. The ability to engage in a conversation about sport, therefore, could be seen as a means of facilitating or extending social capital.

It has been argued that the networks themselves are a form of exploitable knowledge (Tymon & Stumpf, 2003) insofar as we are considering the value of sport, but they are more of an earned—rather than learned—attribute. For that reason, we have not disturbed the modern view that network capacity is a product of social exchange and that it is often a common interest, or knowledge, that founds this.

The more interesting intersection between knowledge and social capital occurs at the point of ethics. On the one hand, the social capital literature is replete with references to its capacity to transfer ethical norms and standards (Fuller & Tian, 2006; Pastoriza, Ariño, & Ricart, 2008). Sports, with their own cultures of fair play, integrity and ethical conduct are seen as both a microcosm of social morality and a proxy for its communication (Sage, 1998)—consider the Victorian ethos that sport is 'character building'. Yet, as the literature on cultural differentiation argues, ethics are a learned value (Hassam, 2007; Small, 2006). Conformity to the ethics of a society has also been demonstrated to yield sustainable profit for both individuals and firms (Bowie, 1998; Maxfield, 2008; Verschoor, 2006). Therefore, when social and knowledge capitals combine in SPR, there is a significant potential for ethical development, which (like the leadership and teamwork capacities so enlarged) may act as a catalyst for commercial productivity.



Symbolic capital

Symbolic capital as a defined concept is often implicit, but under-explored, in sport. Bourdieu (1993) was the first to use the term to describe the value derived from being known and recognised, a concept synonymous with standing, good name, honour, fame, prestige and reputation. In brand terms this is a precise fit with goodwill; for example the symbolic value of the brand explains why a person is prepared to pay more for a Nike shoe than a less-celebrated equivalent. Despite symbolic capital more often than not referring to an individual's capacity to convert their celebrity into wealth, allies and even high-value marriage partners (Bird & Smith, 2005), to some extent—in SPR at least—the individual and the brand are often melded and occasionally indistinct. Consider, after all, the industry that is David Beckham.

For the individual so endowed, symbolic capital acts less as a driver of productivity and more reliably as a conductor. A person is not necessarily able to produce more widgets as a consequence of symbolism, but it is inarguable that their symbolism is a consequence of their SPR productivity or prowess. That symbolism has a momentum that exponentially both attracts additional enterprise and becomes an inspiration for subsequent industrial performance. This is because symbolic capital is also used by external actors as a means of legitimising consumption and endowing upon the consumer a form of distinction that will be recognised by their peers (Flint & Rowlands, 2003). In other words, if I like Ricky Ponting and all my friends like Ricky Ponting, then if use a Ricky Ponting cricket bat my status will be improved amongst my friends (even if my batting average does not).[6] This, together with the other forms of capital acquired as a result of their experiences, may explain why sporting high achievers are often able to pursue successful business careers despite a lack of formal qualifications.

Symbolic capital need not necessarily be confined to the elite domain. There is a limited form of symbolic capital observable in all hierarchies, which in turn are replete in sport. Indeed, the talismanic quality of symbolic capital—the factor that inspires others to emulate their heroes—requires a degree of proximity to be effective (Bandura, 1971; Payne, Reynolds, Brown, & Fleming, 2003). Whereas it may be unrealistic for me to believe I can play golf like Tiger Woods, I can aspire to play as well as my local club professional. Coalter (2008), for one, observes that the development of social capital in underprivileged communities through sport is more dependent on tangible, accessible role models than ideal, heroic types.

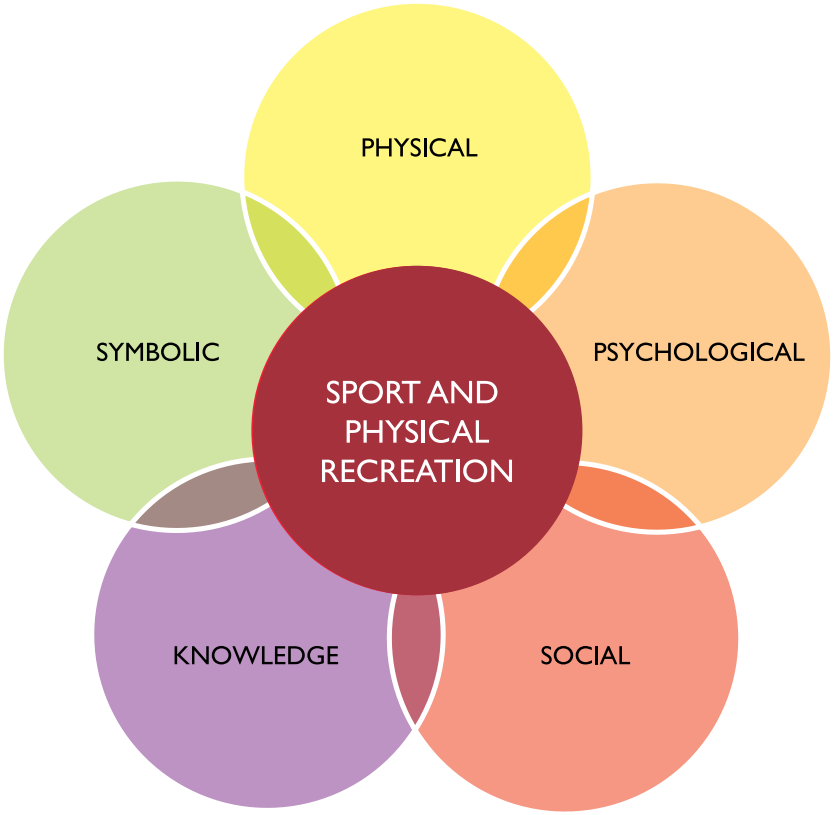
Going beyond Bourdieu, however, the rituals embedded in sport and their symbolic meaning also serve a significant social purpose. These rituals serve on the one hand to legitimise a degree of competitiveness and even physical violence that would not be tolerated in society at large. As such, they can act as a necessary vehicle for humanistic escape. Yet the rituals (that include game rules, expectations and norms) serve to constrain and, to some extent, standardise performance. To that end, SPR feeds the ego; real or imagined mastery of the activity will invariably induce an intrinsic satisfaction that is difficult to replicate outside the sphere of sport and physical recreation. It is not unreasonable to assume that this sense of wellbeing will continue with positive effect into the commercial domain.

Indeed, it is the shared appreciation of the rituals that links spectators to facilitators and active participants, and defines the recreation. It should be noted that the word 'recreation' is etymologically referring to 're-creation'. In other words (and acknowledging that sport is a species of recreation) through SPR the mind and body are rejuvenated for more efficient operation (Wesson, Wiggins, Thompson, & Hartigan, 2000) or the more productive application of labour (Cameron & Gidlow, 1998). So in as much as active participants enjoy the physical benefits of their pastime, they also enjoy the leisurely qualities of escape, recreation and rejuvenation. Spectators, too, find an equivalent release in their embrace of the symbolic trappings of their preferred contest. Voluntary sport and physical recreation personnel also sacrifice other forms of leisure to both attach and aspire to the symbolic value of their host (whereas professional loyalty may be more institutional and brand-driven). To that end, symbolic capital enlarges bystander engagement with sport and is as necessary to the survival of the sporting species as it is to realising economic promise.

[6] For the last three years, Ricky Ponting has been valued as Australia's 'most marketable sports person' (Sweeney Sports 2009)

Therefore, the catalytic potential of sport and physical recreation endowed symbolic capital is multiple: it can be accrued in individuals, products and even sports themselves for financial leverage (brand) or it can be used as a motivation for productivity in those who are deficient (inspiration). In addition to its operationalisation in the form of socially necessary rituals, it can be used to link spectators, volunteers and active participants through their shared enjoyment of its re-creative meaning.

Figure 4.1 – Sport and physical recreation capital



5. Benefits of SPR

Health benefits

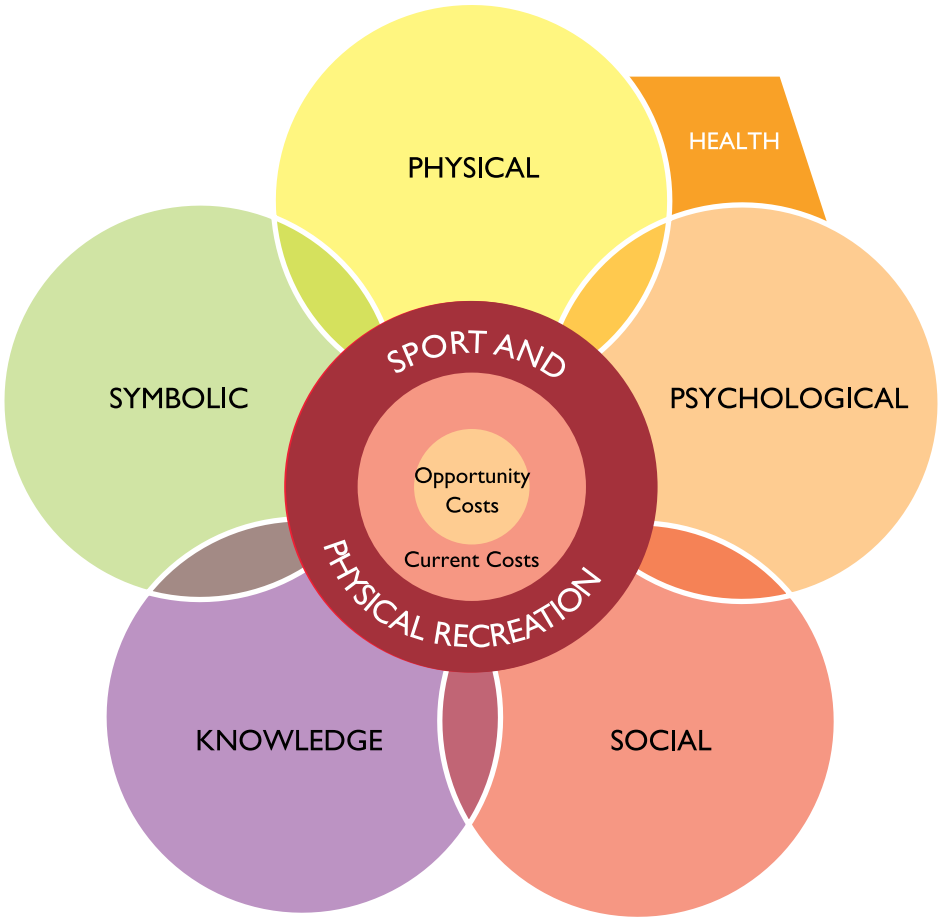
Although putting a dollar value on the life of a person may appear mercenary, it is a necessary and widely accepted practice in policy. Because there are only a finite number of resources available to society, trade-offs are inevitable. For example, Australian society accepts that the costs of mandating the use of seat-belts in motor vehicles is worth the benefits received in terms of lives saved, whereas the cost of making everyone drive at 10 km/h is seen to be prohibitive.

The statistical value of a human life is therefore an estimate of the financial value that society is willing to pay to reduce the average number of deaths by one. There are a number of approaches to calculating this. A review by Abelson (2007) found that in studies relevant to Australia, estimates ranged from $3 million to $15 million, depending on the methodology applied. An Access Economics (2006, 2008) report on the cost of obesity, for example, uses $6 million as its statistical value of life.

The Australian Government's Office of Best Practice Regulation (OBPR, 2008) adopts $3.5 million (in 2007 dollars) as the value of statistical life based on a healthy person living another forty years. Discounted for present value and indexed, in accordance with OBPR advice, to 2009 prices, this makes the value of a statistical life year (VSLY) $158 963. Given the policy context and conservative tendency of this report, we prefer this to other measures.

It is estimated that in 2008-09 a potential cost of **$718.4 million** was avoided due to the current rate of regular participation in Tasmanian SPR.

Figure 5.1 – Health benefits as an outcome of SPR



Disability adjusted life year

Developed by the World Health Organisation (WHO), the disability adjusted life year (DALY) is a measure of the overall burden that disease places on a society. Countries previously measured the impacts of disease by the number of life years lost; DALYs combine this measure with the cost of years lived with disability. The DALY therefore estimates the impact of premature morbidity and mortality on a population in a single, comparable metric.

One DALY can be thought of as one lost year of 'healthy' life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability (WHO, 2008).

In 2008-09 in Tasmania, it has been estimated that there were 77 295 healthy life years lost in this way (DALYs). Using the table below (Begg et al., 2007), we conclude that the human cost of physical inactivity in Tasmania in 2008-09 can be valued at $823.2 million. At present rates of regular participation, the threshold necessary to achieve the health benefits of SPR ((Warburton, Nicol, & Bredin, 2006b), this translates as healthy life 'bonus' of **$718.4 million**.

Another way to put this would be to say that if the 46.6% of Tasmanians who regularly participate in SPR suddenly became inactive, society would be burdened by an extra cost of $718.4 million. It should be noted that this table only considers a narrow range of disease states that are attributable to physical inactivity, so this total is likely to be an underestimate. A more complete catalogue is discussed in the next section of this report.

Table 5.1 – Tas DALYs attributable to physical inactivity by specific cause (2008-09)

Disease		Tas DALYs lost
Ischaemic heart disease	3.4%	2 628
Type 2 diabetes	1.3%	1 005
Stroke	0.9%	696
Colorectal cancer	0.6%	464
Breast cancer	0.5%	386
Total		5 179
VSLY cost		$ 823.2m
VSLY saved		**$ 718.4m**

Figure 5.2 – The potential cost of physical inactivity in Tasmania (2008-09)

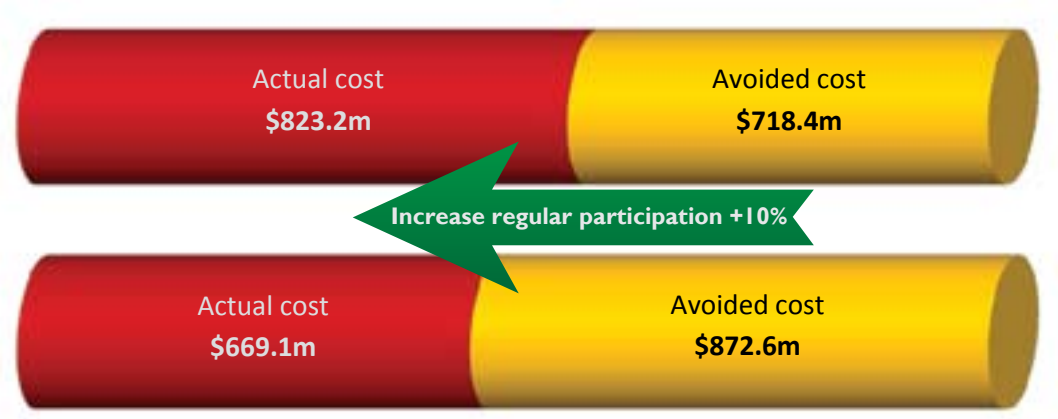


Figure 5.2 shows that increasing the regular rate of participation in SPR by 10 percentage points to 56.6% would add **$154.2 million** to the welfare of Tasmanian society.

Civic benefits

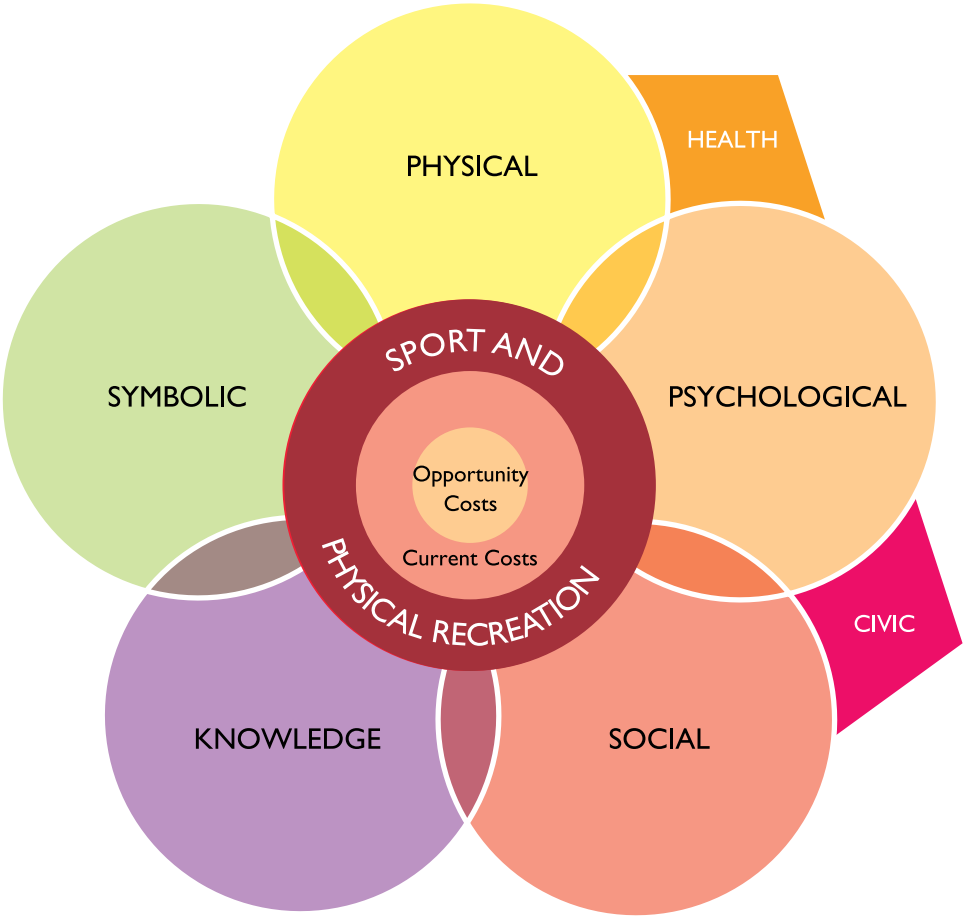
A number of civic obligations are relieved by the extent to which a society participates in SPR. For example, if the community provides a level of care to those injured through SPR (as quantified in Appendix 2), then it is reasonable to assume that a corresponding need for care is avoided by those who are healthier as a result of their SPR participation. Similarly, it is known that SPR can be a means to both divert and reform users of our institutions of criminal and social justice.

The delivery of sport and physical recreation is further subsidised by the labour of volunteers, which relieves other civic bodies (such as governments and community groups) of the need to directly provide these services. SPR events and activities also raise Tasmania's off-shore profile, thereby adding value to the Tasmanian 'brand', and they contribute directly to the community's sense of wellbeing.

The sum of these benefits to Tasmania in 2008-09 is estimated to be **$207.7 million.**

This total does not include an empirical estimate of a range of other civic benefits that were outside the scope of this report, including the democratic value of SPR, and the extent to which certain expressions of SPR 'green' the environment, reducing and even converting carbon and other forms of pollution. For this reason it can be taken as an underestimate.

Figure 5.3 – Civic benefits as an outcome of SPR



Health care

The discussion here explores the relationship of SPR to the formal systems of health care that are enabled by society. These include all private and public, recurrent and capital expenditure on hospitals, medical services, dental services, patient transport services, other health practitioner services, community and public health services, medications, aids and appliances, health research and the administrative systems that support these services. These are distinct from the quality of life, or DALY, outcomes valued in the previous section on Health, and do not include the opportunity costs of voluntary carers.

As the most reliable estimate of the cost of health care in Tasmania is the aggregate of public and private spending provided by the Australian Institute of Health and Welfare (AIHW 2009b)—see *Appendix 2*—we continue with a whole-of-system approach to calculating the health benefits that SPR may enable. Given the tendency of research to calculate the cost of physical inactivity, we proceed with that methodology to the point where an estimate of the same cost to Tasmania is available. As was done in the previous section, we then invert that figure (by the appropriate ratio) to arrive at the gross saving to the system; this is the default of regular sport and physical recreation participation.

Risks of disease are often assessed by comparing rates of health or disease in some groups exposed to a risk factor to those not exposed to the risk factor. For example, those who smoke tobacco are more than ten times as likely to develop lung cancer when compared to non-smokers (Stephenson, Bauman, Armstrong, Smith, & Bellew, 2000). The most current and reliable estimates of the Relative Risks (RR) of physical inactivity (Katzmarzyk & Janssen, 2004) are reproduced in Table 5.2. We have added to these local RR estimates of depression and falls (Econtech, 2007a).

Table 5.2 – The relative risk of physical inactivity

	RR	95% CI [7]
Coronary artery disease	1.45	1.38–1.54
Stroke	1.60	1.42–1.80
Hypertension1	.301	.16–1.46
Colon cancer1	.411	.31–1.53
Breast cancer1	.311	.23–1.38
Type 2 diabetes	1.50	1.37–1.63
Osteoporosis	1.59	1.40–1.80
Depression	1.25	NA
Falls	1.50	NA

A physically inactive person is 1.45 times (or 145%) more likely to contract a coronary artery disease than a regular participant in SPR. It should also be noted that the relative risk of physical inactivity actually increases the longer a person spends sedentary. This is because the longitudinal method used to calculate RR is rarely adjusted for the effect of sedentary people who later become active (Andersen, 2004). It therefore follows that our estimate here of the benefits to the health system of SPR is likely to be understated.

The Population Attributable Risk (PAR) of physical inactivity is the reduction in the incidence of those diseases that would be observed if the population were perfectly physically active, compared with its current (actual) rate of participation (Rothman & Greenland, 1998). The formula for calculating PAR is expressed as follows:

$$PAR = \frac{P(RR-1)}{1+P(RR-1)}$$

P = percentage of the population physically inactive
RR = relative risk factor

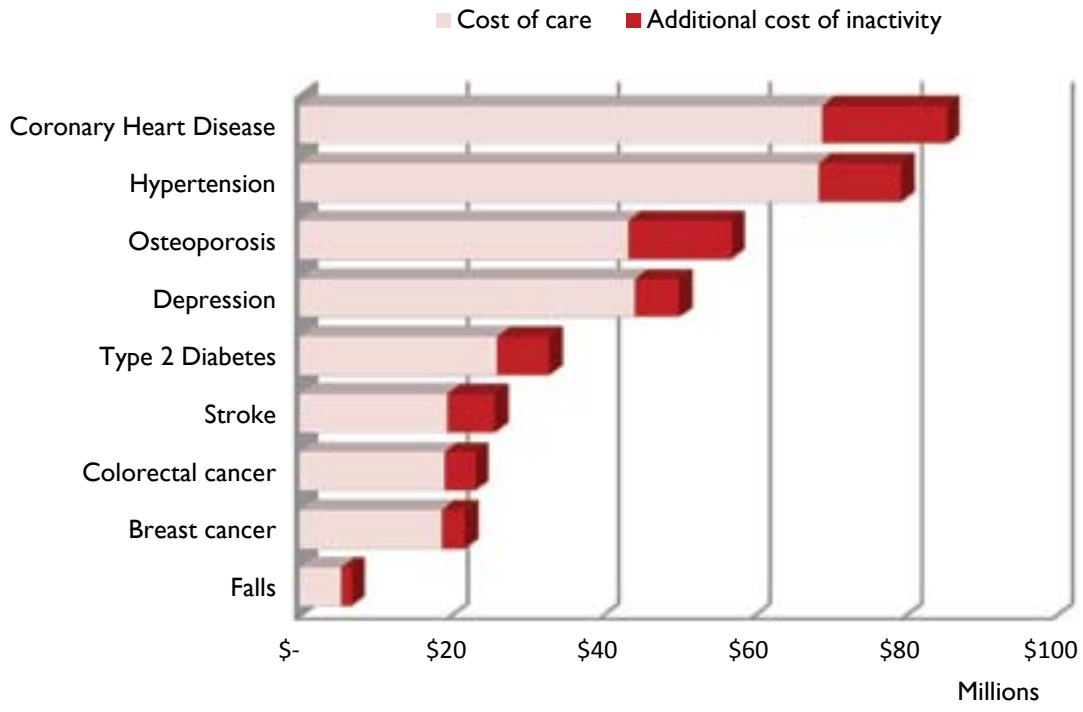
[7] Confidence interval.

Table 5.3 calculates the PAR of physical inactivity of each disease, and multiplies this by the cost to Tasmania of each disease state. The method for calculating the cost to Tasmania of each disease state is disclosed at Appendix 6. Figure 5.4 graphically illustrates the additional costs borne by our system of health care as a result of the insufficient physical inactivity of 46.6% of Tasmanians.

Table 5.3 – The cost of physical inactivity to Tasmania (2008-09)

	Cost to Tas ($m)	PAR	Total ($m)
Coronary heart disease	$85.5	19.37%	$16.6
Stroke	$25.8	24.27%	$6.2
Hypertension	$79.5	13.81%	$11.0
Breast cancer	$21.8	14.20%	$3.1
Colorectal cancer	$23.2	17.96%	$4.2
Type 2 diabetes	$33.0	21.07%	$7.0
Osteoporosis	$57.0	23.96%	$13.7
Depression	$50.1	11.78%	$5.9
Falls	$6.9	21.07%	$1.4
			$69.0

Figure 5.4 – The cost of physical inactivity to Tasmania (2008-09)



The cost of physical inactivity to our entire system of health care is estimated to be $69.0 million. Therefore, Tasmanians who are physically active through regular SPR participation enable society to avoid an equivalent, proportionate cost. Given a regular participation rate of 46.6%, the fiscal value of that benefit is **$60.2 million**. This represents **2.4%** of the total amount spent on health care.

The benefit to cost ratio is also **19:1**. In other words, in 2008-09, for every dollar spent on SPR injury, Tasmanians saved $19 through their collective participation.

This estimate is consistent with results observed in other jurisdictions. In the USA, annual direct medical costs attributable to physical inactivity are in the region of $US24 billion, which is 2.5%–3% of all direct medical costs (Oldridge, 2008). Other studies from Canada, Switzerland and the UK also report estimates that are in the range of 1.5%–3% of total direct health costs (Oldridge, 2008).

This figure does not include government savings in welfare payments, or taxation revenue potentially gained through the realisation of the opportunity cost. Note, too, that there is almost no formal research into the relative risk of physical inactivity and other disease states such as sexually transmitted diseases and drug and alcohol addictions, even though there is a large body of evidence that suggests a causal link. Taken with our other conservative assumptions, this total should be considered a significant underestimate.

Justice

SPR has also proven to be a significant contributor to our formal and social systems of justice. Specific programs have been very successful at both diverting (Farrell, Johnson, Sapp, Pumphrey, & Freeman, 1995) and rehabilitating (Nelson, Specian, Tracy, & DeMello, 2006) people from criminal conduct. Despite some criticisms of the quality of such programs (Coalter, Allison, & Taylor, 2000) and the reliability of their outcomes (Nichols & Crow, 2004), there remains a body of evidence that argues that when properly employed (Morris, Sallybanks, Willis, & Makkai, 2003) SPR can be a more effective discouragement to deviant behaviour than, for example, the threat of incarceration (Wheeler & Hughes, 1968). Appropriately designed SPR facilities can also reduce incidences of urban crime through the application of the principles of crime prevention through environmental design (McCormick, 2006).

SPR also impacts on the broader construct of social justice. The employment opportunities created by SPR relieve to some extent the welfare burden of the state (Gratton, Shibli, & Coleman, 2005). In a similar vein, SPR is regularly used as a driver for charitable fundraising (Juggins, 2000; Nettleton & Hardey, 2006; Platow et al., 1999). The ideal aims of social diversity and inclusion are also viewed as potential beneficiaries of SPR activity (Amara et al., 2004; Woodward, 2007), and SPR is often extended in this context to connect people with other social and community services (Mulholland, 2008). The reader is cautioned that SPR does not inherently realise the full fruits of, for example, multiculturalism, and may actually be counter-productive to this purpose unless directed (France & Roche, 1998). Despite this, where social diversity or inclusion is a planned outcome, sport can act as a progressive vehicle for its delivery (Bahn, Hancock, & Cooper, 2008; Suzuki, 2007).

It is thus reasonable to assume that if there were no SPR in Tasmania, then the social and criminal justice burdens of society would be greater than they currently are. Yet there is no attempt in the literature to quantify this benefit; ours is a novel approach that continues the method applied in the discussion of health, above. We adopt here the 2.4% of total health savings identified and apply it to the organs of criminal and social justice in Tasmania that might benefit from the community's participation in SPR.

Within the Tasmanian Departments of Justice and Police and Emergency Services, we have distinguished those output groups that are most likely to benefit from SPR. These include the courts, police, Corrective Services and Consumer Services. Excluded from consideration are functions such as Electoral Services, the Registrar (of births, deaths and marriages), and the State Emergency Service. Also excluded from consideration is an estimate of the cost of local, federal and community spending in this regard.

It is estimated that in the absence of SPR, Tasmanians would have been liable for $6.9 million above and beyond the 2008-09 expenditure of $285.4 million on criminal justice in the state.

As a proxy for social justice, we have adopted Tasmanian and commonwealth government spending on Human Services, which totalled just over $300 million. Tasmania allowed a further $174.0 million for 'social inclusion' in its 2008-09 budget (DTF, 2008). Other social justice services are provided by charitable and community organisations. In 2008-09, Tasmanians gave $54.8 million to charitable organisations (not including SPR providers) (ATO, 2010).

It is estimated that in the absence of SPR, Tasmanians would have needed to find an additional **$12.8 million** (on top of the 2008-09 expenditure of $527.4 million) to deliver the same standard of social justice that is presently enjoyed in the state.

A total of **$19.7 million** is therefore considered to be the civic contribution of SPR to Tasmania's systems of criminal and social justice. The figures quoted in this section nonetheless remain subject to validation through future research.

Brand Tasmania

Every time that Tasmania is associated with a SPR activity, event or individual, it 'brands' the state—even temporarily—in the public consciousness. For example, many Australians would associate the name David Boon with cricket, a distinctive physical appearance, and the southern isle. Such branding is known to influence purchase behaviour. For the state, this means that people make tourism or even migration decisions that are founded on the strong and positive associations they have with Brand Tasmania. SPR has a prominent role to play in that associative dynamic.

Despite the importance of the Tasmanian—or, indeed, any region's— brand, it is exceedingly difficult to assign a dollar value to it; however, conducting a media advertising campaign on Tasmania's behalf does come at a fixed cost. The willingness of Tourism Tasmania and like agencies to purchase media space to this end suggests that they perceive a return from this activity that is at least equal to the dollars spent. Therefore any editorial or indirect mention of Tasmania in the media can be valued at its equivalent market or replacement cost, all of which goes toward building the brand.

A study by Repucom (2008) on the value of the Tasmanian Government's sponsorship of the Hawthorn Football Club (HFC) in that year found that the replacement cost of Tasmania branded media exposure driven by the sponsorship was $3.4 million, which returned an economic impact of $15.1 million. The 2008 Mark Webber Challenge has also been credited by the Tasmanian Government with generating $7 million-worth of media exposure in national and international markets (Tourism Tasmania, 2009).

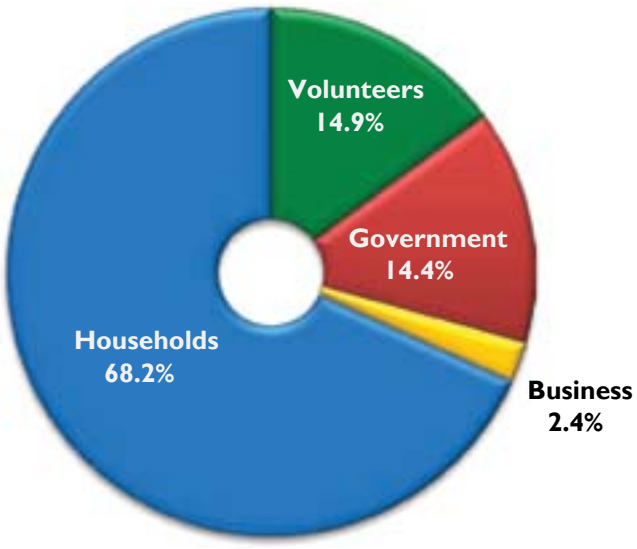
As these two events alone effectively leveraged over $10 million of media value, it is not unreasonable to assume that an equivalent amount was contributed by Tasmania's other newsworthy SPR activities. In 2008-09 these included the Sydney to Hobart Yacht Race, VB One-Day International Cricket Series, Moorilla Open Tennis Tournament, Targa Tasmania and numerous national championships or competition rounds. Although our method is somewhat crude, we estimate that in 2008-09 SPR added at least $20.0 million in value to the Tasmanian brand. It is likely that specific research into this will reveal a much larger benefit.

Volunteering

The labour of volunteers is another civic contribution of SPR to the community. As stated in the previous section on SPR participation in Tasmania, it is estimated that Tasmanians contributed over three million voluntary hours to SPR in 2008-09. The replacement cost of this labour is determined by calculating what it would cost the SPR industry to employ people to perform the equivalent work. It is presumed that each volunteer age cohort necessarily brings skills commensurate with their professional experience; therefore, it is not simply a case of replacing them with industry minimum or even median wage labour. The overhead costs of administration and capital must also apply to each SPR business, and the overhead costs of taxation (such as superannuation, workers' compensation and payroll tax) must be additionally allowed for.

Using median wage data and the distribution of volunteers by age and gender introduced elsewhere in this report, we find that the cost of replacing SPR volunteers in Tasmania (at the industry preferred, if practically unrealistic, full-time equivalent rate) would be **$107.7 million.** If government or other civic institutions did not meet this shortfall, the absence of voluntary labour would increase the cost of SPR participation to households by **$9.97 per week,** or 120%. Although much is made of the value of sponsorship, Figure 5.5 shows that in the Tasmanian experience, the contribution of volunteers is effectively worth over **six times** the value of corporate philanthropy ($17.6 million), and is greater than the whole-of-government contribution ($103.6 million).

Figure 5.5 – The effective subsidy of SPR in Tasmania (2008-09)



Environment

Lower-order SPR participation is much more carbon friendly than many other leisure alternatives. Therefore the rate at which Tasmanian commuters elect to cycle or walk for necessary journeys (thereby substituting a more polluting form of transport) is relevant to our enquiry. Interestingly, it is also more economically efficient (in terms of retail return per square metre) to allocate public space to bike instead of car parking (Lee & March, 2010). Unfortunately, the few head-counts done on infrastructure usage (for example Cycling South 2010) are methodologically inconsistent with our valuation purpose.

Despite these positives, elite sport—especially that conducted in stadia under lights—has a significant carbon footprint that may well cancel out or even outstrip the environmental benefits afforded by SPR participation. Once again, however, we could not find any data in this domain that could be reliably applied to the Tasmanian experience.

It should also be noted that the green space created by outdoor SPR precincts—from sports fields and parklands to native forests—is an important ecological and psychological response to urban sprawl (Friedman, Andrews, & Silk, 2004; Pretty, Peacock, Sellens, & Griffin, 2005). The tangible benefits include their utility as a resting space for fauna; a positive impact on air-quality; abatement of urban heat build-up; and their contribution to drainage and storm-water control (SGS Economics and Planning, 2010). Less tangibly, these 'just in time' recreational spaces make communities notably attractive to both the emerging class of highly mobile knowledge workers and the firms that employ them (Florida, 2002). The economic extent of these impacts also remains unquantified.

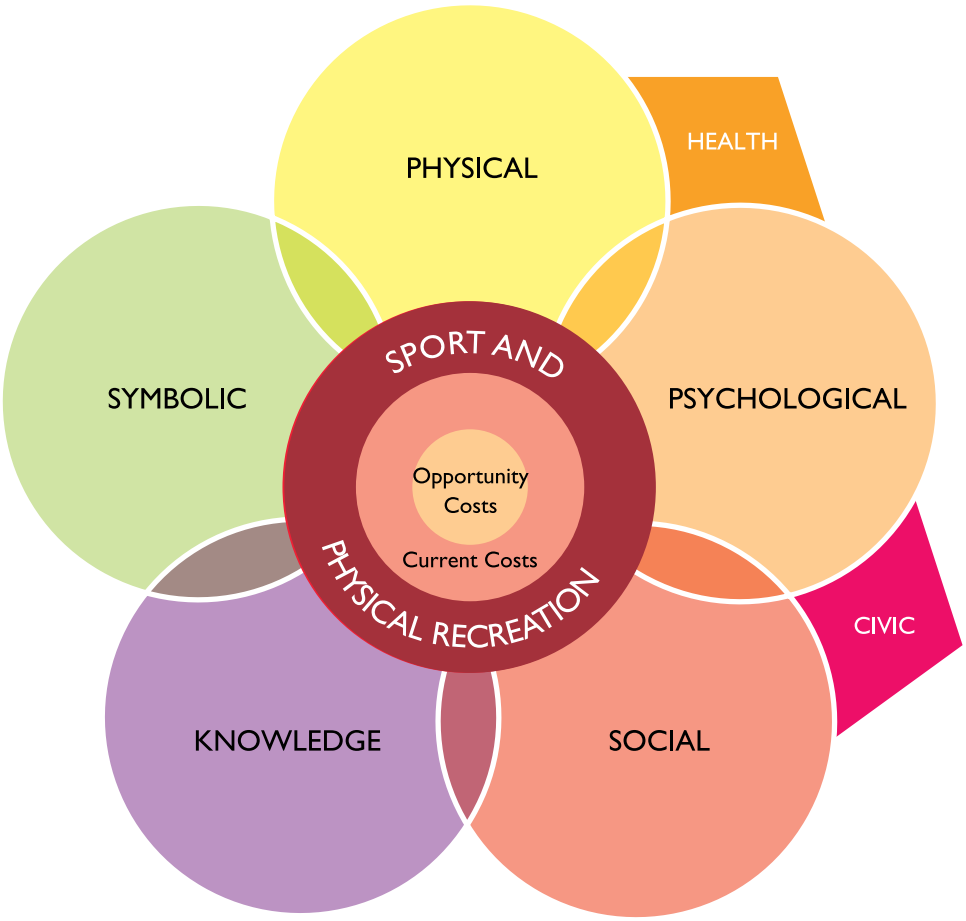
Other civic benefits

Philosophers from Aristotle to Dworkin (2005) have argued that a robust democracy depends on the active participation of its citizens. The logic has been that for a government to be truly representative, as many constituents as possible must be connected and contributing to the social discourse. Putnam (2000) proposes that social capital is the mechanism that facilitates this, and research in this field strongly connects SPR participation with a willingness to vote and engage in formal political membership (ISSP, 2001).

SPR is also a necessary agent of governmentality if the state desires to devolve some of its liability to the populace. That SPR is increasingly subject to state intervention suggests not so much intention on the part of government to assume responsibility for it, but a desire to use SPR as an agent for government rationalities (Green & Houlihan, 2006). An example of this is the federal government's intention to link SPR funding to responsible alcohol consumption (AAP, 2008).

At a more fundamental level, sport and its personalities are regularly used as a 'meeting point' in water-cooler discourse. The shared recognition of the characters and issues in sport facilitates conversation and acts as a focal point for social debate, which in turn informs policy. Attention to sport-connected issues as diverse as racial vilification, parental ethics, binge drinking and sexual consent have contributed to the evolution of community morality and elicited political response.

As with the environmental impacts, this report has not attempted to locate and assign an economic value to these SPR benefits. We recommend them as a direction for future research.



Productivity benefits

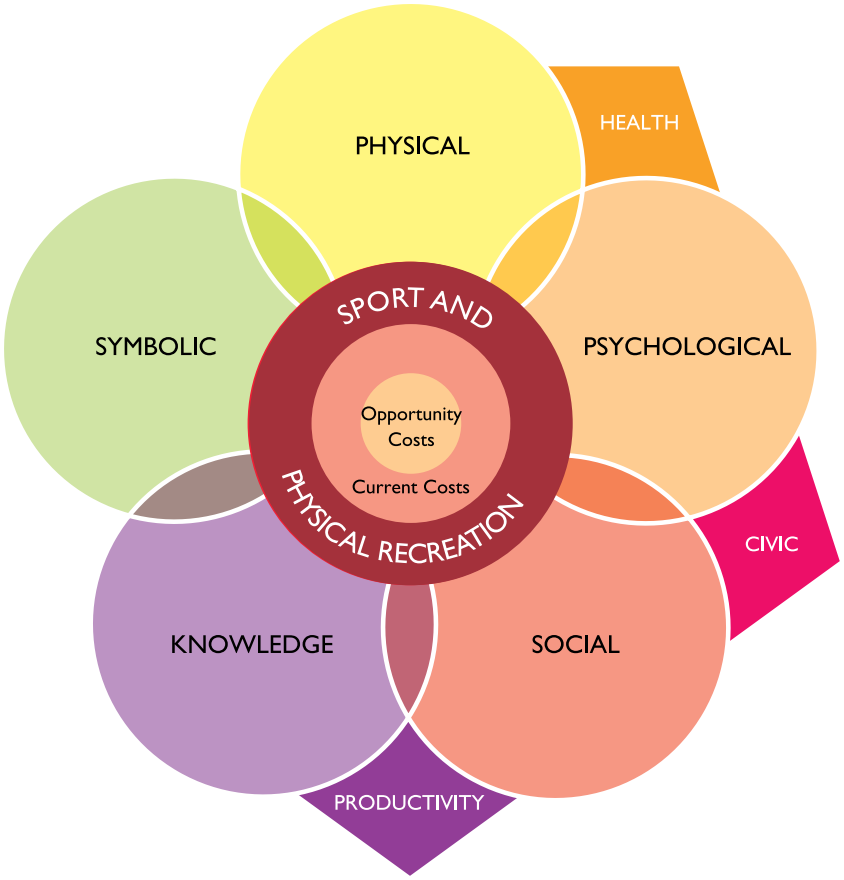
Productivity refers to the efficiency and effectiveness of labour, and is usually measured by output. In other words, a worker who can manufacture four widgets per hour is said to be twice as productive as their colleague who can only produce two.

It has long been assumed that participation in SPR can increase the productive output of workers; however, there have been almost no successful attempts to quantify this contribution. The main barrier to analysis appears to have been complexity of process. SPR is known to enhance a number of human attributes (see the section on SPR capital) that are known to increase labour productivity; however, the overlapping quality of these attributes, the unique ways in which they are arrived at and their causal attribution to SPR have made it exceedingly difficult to definitively state that x% of a person's output is a direct result of their SPR participation.

Here we have defined the contribution of regular participation in SPR to productivity by the value added to an individual, and the corresponding value saved by the employer and industry (Goodchild, Harris, Nana, & Russell, 2000). By our reckoning, Tasmania benefited to the tune of **$311.6 million** in 2008-09. Depending on the assumptions of the underlying economic model, increases in productivity may result in increased investment due to higher capital productivity, increased wages and demand for goods, or, if demand is static, increased time available for leisure and/or work.

Importantly, our method *includes* in this figure any losses to industry that may result from a regular SPR participant's injury or intention to otherwise avoid work. It nevertheless stops short of quantifying the theoretical contribution that SPR innovation makes to the gross productivity of the community; neither does it calculate the cost to society of a physically inactive person's lower rate of workforce participation.

Figure 5.6 – Productivity benefits as an outcome of SPR



Employer benefit

A recent study by van Amelsvoort, Spigt, Swaen & Kant (2006) found that workers who were physically active[8] in their leisure time reported significantly less sickness absence compared to inactive workers. The net benefit was 4.7 less sick days per year. This finding was consistent with the results of a prospective study that showed that, over a period of four years, workers who engaged in sports had 20 days less sick leave compared with non-sporting workers (Heuvel et al., 2005). Based on a five-day, 46-week working year, Tasmanian industry would therefore enjoy an additional productivity bonus of 2.14% from its workers who are regular participants in SPR.

Another way to look at this is that employers not only pay a wage premium (for which they receive a corresponding return in output), but they save the equivalent of 2.14% of their wage liability thanks to regular SPR participants. Indirectly-related employment expenses saved (such as recruitment and staff training costs) are also likely, but not quantified here.

The van Amelsvoort et al study stands out not just for its rigorous method—nearly 9 000 workers were assessed over 18 months—but for the implication that the effect of SPR-related injury is already built into the findings. In other words, because the SPR-related absences of workers are recorded by default, there can be no suggestion that the gross losses to industrial productivity caused by SPR are greater than the gross losses of inactivity. As an aside, the same can be said of arguments that propose that SPR-engaged workers take more time off to indulge in their active pastime.

Acknowledging that different age groups participate and earn at different rates, distinction is made across 10-year cohorts and distributed by full- and part-time wages. It is also assumed that employers base wages on the average productivity of the group, with SPR participation as an unidentified determinant. Therefore, the benefits of SPR participation are not captured individually (which would alter the preference for SPR activity), but collectively.

It should finally be noted that, as with health, we have only calculated the productivity premium of *regular* SPR participation. Even though the evidence suggests that similar psychological, social, knowledge and symbolic benefits attach to individuals who participate to a lesser degree—or merely volunteer in, facilitate or identify with SPR—a lack of distinguishing data frustrates the measurement of this. Dose-response evidence with relation to absenteeism also indicates that the threshold of regular participation must be met in order for any benefits to be observable (Proper, van den Heuvel, De Vroome, Hildebrandt, & Van der Beek, 2006).

Table 5.4 – The productive value of SPR to Tasmanian industry (2008-09)

Age	Full-time & Regular SPR	Productivity premium ($m)	Part-time & Regular SPR	Productivity premium ($m)	Total ($m)
15–19	3 385	$2.26	061	$1.3	$3.5
20–24	9 064	$8.83	494	$1.5	$10.4
25–34	12 687	$17.24	001	$2.7	$19.9
35–44	17 832	$28.47	426	$5.5	$33.9
45–54	20 434	$32.7	7 521	$5.8	$38.4
55–59	6 821	$10.53	573	$2.6	$13.1
60–64	3 666	$5.62	366	$1.9	$7.5
65+	1 440	$1.91	485	$1.0	$2.9
					$129.6

[8]The physical activity threshold for this study was a minimum of two days/week; however, we have continued to apply the more conservative threshold of three days/week. Our findings are therefore likely to be an underestimate of the actual benefit.

Employee benefits

The above reckoning estimates the benefits that accrue to employers as a result of their employees' participation in SPR. Yet is this the full extent of employers' gain?

The sum of capitals earned by a regular SPR participant must add more to their productive capacity than a few extra days in the chair. Although there is surprisingly little quantitative research into this, Shoenhair (1989), for one, has found that exercisers are rated significantly higher than their sedentary counterparts with respect to work quantity, communication, interpersonal relations, leadership and overall productivity.

One way to quantify this contribution might therefore be through the theoretical lens of 'presenteeism'; that is, the state of being physically present at work, but less than fully functional because of illness or other distraction (O'Donnell, 2009).

A report commissioned by Australian private health insurance provider Medibank Private considered the economic cost of presenteeism resulting from 12 different medical conditions (allergies, arthritis, asthma, cancer, depression, diabetes, heart disease, hypertension, migraine/headache, respiratory disorders, skin conditions and back, neck or spinal problems). It found that the overall average labour productivity loss caused by presenteeism is estimated to be about 2.5% of gross domestic product (Econtech, 2007b). Other, international studies have estimated the cost to employers of presenteeism to be as much as 6.8% of all labour costs, above and beyond the absentee expense (Collins, Baase, Sharda, Ozminkowski, & et al., 2005).

Presenteeism is however, an incomplete proxy for the productivity benefits of SPR, as measures of it are typically limited to the impact of disease states. The social networks, knowledge attributes and symbolic motivators that extend from SPR participation to enhanced productivity must also be accounted for in any fair reckoning of benefits. In the absence of proven measures, we assume that regular participation in SPR enables at least a 3% increase in an employee's productive value (with no additional value assigned to occasional participants). This is a low-ball estimate, given the known range of presenteeism impacts and the theoretical surplus of SPR capital.

Using that figure, we monetise the SPR-related increase in productivity using the theoretical equality between wages and the marginal productivity of labour. In the economics of production and firms' employment decisions, the firm maximises profits by employing workers up to the point at which the marginal increase in revenue associated with each new worker is equal to the cost borne by the firm (their wage).

In other words, as productivity rises, the wages that can be paid to workers increases. Therefore the increase in productivity associated with SPR engagement will result in an increase in aggregate wages across the economy.

$$\text{Productivity value of SPR} = (SPRw/T) \times \Delta P \times W$$

SPRw = number of SPR participants (workforce)
T = total workforce
ΔP = average increase in productivity
W = total wages (compensation of employees)

By some standards, this may be considered a 'cost' to employers, as the extra wage effectively comes from their purse. We take the position here that this cost is equitably returned to them in the form of improved output, and that the SPR-enabled resource (that they effectively bid on in the labour market) remains the property of the employee. The same data that was used to estimate the productivity premium to industry can therefore be applied to calculate the benefit of regular SPR participation to individuals.

Table 5.5 – The productive value of SPR to individual Tasmanians (2008-09)

Age	Full-time & Regular SPR	Productivity premium ($m)	Part-time & Regular SPR	Productivity premium ($m)	Total ($'m)
15–19	3 385	$3.16	061	$1.8	$4.9
20–24	9 064	$12.43	494	$2.2	$14.6
25–34	12 687	$24.24	001	$3.8	$28.0
35–44	17 832	$39.87	426	$7.7	$47.5
45–54	20 434	$45.97	521	$8.1	$54.0
55–59	6 821	$14.83	573	$3.6	$18.4
60–64	3 666	$7.92	366	$2.6	$10.5
65+	1 440	$2.61	485	$1.4	$4.1
					$182.0

Innovation

There is a growing awareness in policy that the ability to innovate is a fundamental driver of economic progress, social welfare, and national competitive advantage (OECD, 2007); however, little is known about the contribution of SPR to innovation. It is not the place of this report to remedy this, but we do advance several examples of community-significant innovation that have emerged from the SPR sector and argue that this is the tip of a massively underappreciated iceberg. Academic acknowledgement (if not social exploitation) of SPR as a hub of twenty-first century innovation is long overdue.

Since the middle of the last century, the scientific study of human movement has been noticeably driven by research into elite sport, and the innovations in this field—and their public worth—are too numerous to catalogue. Similarly, SPR management (both on- and off-field) has had a major impact on how we perceive and apply organisational and inter-personal dynamics (Wolfe, Weick, Usher, Terborg, & et al., 2005). Sports journalism, too, is at the cutting edge of media innovation, something which has diffused into the way the world is generally presented to us and our attitudes formed (Chalip, Green, & Hill, 2003; Wheaton & Beal, 2003).

There is also a modern imperative to integrate SPR facility design with environmentally responsible practices (Abbaspour, Karbassi, & Khadivi, 2006; Sherwood, 2007), which has led to some remarkable efficiencies in the way we consume natural resources. The notion that SPR can be a vehicle for accelerating social change is rapidly gaining traction (Bailey, 2005; Glover, 2004; Peters, 2006). Indeed, there is even recognition that SPR, through the plethora of potentials discussed here, can be the new medium for regional engagement and the distribution of foreign aid (Australian Government, 2008; Merkel, 2008; Schulenkorf, 2008).

The value of individuals who are more innovative as a result of their SPR participation has been implicitly estimated in the productivity surplus; however, we have not attempted to delineate and assign an economic value to the community-wide benefits of SPR innovation. We recommend this as a direction for future research.

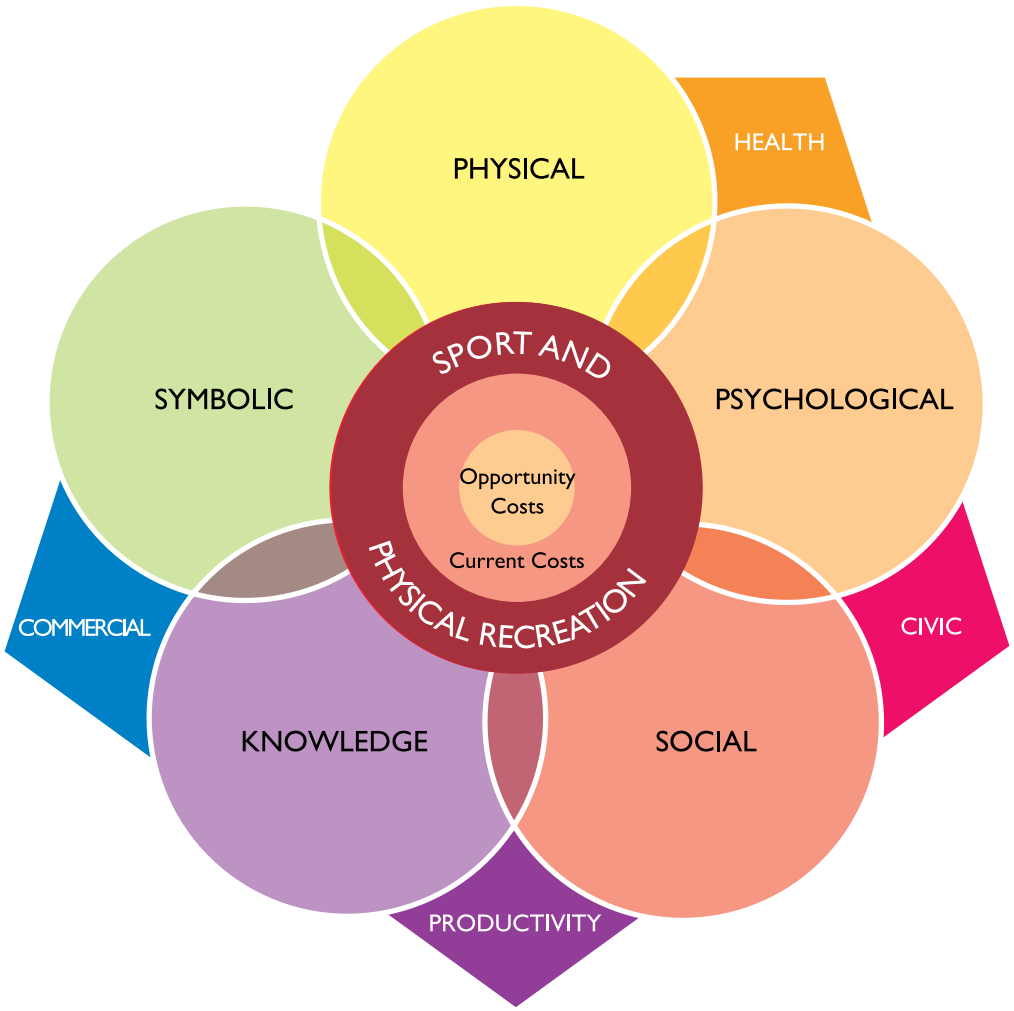
Commercial benefits

Expenditure on SPR creates a change in final demand that has an economic impact on employment, output and gross state product. The economic impact includes the impact on intermediate goods and the compensation of employees. Although a full accounting of current costs necessary to this has already been made, there is another source of impact on final demand that needs to be considered—spending from external sources, or SPR exports. This is the sum of monies that flow into Tasmania as a result of the state's SPR industry, and is estimated at *Appendix 7* to be **$451.6 million**. Therefore, the sum of economic inputs that were related to or motivated by SPR in Tasmania in 2008-09 was **$1,047.1 million**.

Using the Tasmanian Regional Input-Output Matrix (RIOM) model, we estimate that the impact of this expenditure was to increase output in the Tasmanian economy by **$1.84 billion.** The increase in wages, rents, profits and taxes associated with the increase in production is estimated to have increased Tasmania's gross state product by **$819.3 million** (compared to an alternative case in which those resources were idle due to a lack of demand). The expenditure associated with SPR is also estimated to have generated in the order of 13 000 jobs, both full-time and part-time. This represents approximately 5.2% of the Tasmanian workforce, or one person in 20.

The most critical impact, however, is the producer surplus delivered by SPR. Producer surplus is an economic measure of the difference between the amount that a producer of a good receives and the minimum amount that he or she would be willing to accept for the good. The difference, or surplus amount, is the benefit that the producer receives for selling the good in the market. An alternative, if theoretically imperfect, description of this is net profit. We estimate that in 2008-09, Tasmanian SPR delivered **$372.8 million** of additional value to all producers, of which **$188.4 million** was returned to the government in taxes.

Figure 5.7 – Commercial benefits in the SPR value model



The value of expenditure associated with SPR can be understood in two contexts. Firstly, the amounts spent by individuals, businesses or government on SPR reveal an additional value that the community perceives in the activity. Secondly, expenditure on SPR creates a change in final demand that has an economic impact on employment, output and gross state product. The economic impact includes the impact on intermediate goods and the compensation of employees.

Analysis of the total impact, including indirect effects, is based on an understanding that industries, and individual companies within these industries do not exist in a vacuum, but use each others' products to produce their own. Thus, an increase in demand for one industry's products leads to increases in the demand of other 'linked' industries. An Input/Output (I/O) representation of the economy is comprised of a set of industries which are linked by these I/O or intermediate relationships and by the final demand for each industry's output. The model used in this report is the Tasmanian-specific iteration of the Regional Input-Output Matrix (RIOM) model.

Broadly, I/O modelling examines how different industries interact to produce final demand. For example, a dairy farmer (as part of the Agriculture industry) may sell some of his or her milk to a milk processing company (part of the Food Product Manufacturing industry), which uses it as an ingredient in their chocolate milk. This company in turn sells some of its output to a food wholesaler (part of the Wholesale Trade industry), who sells some of it to a supermarket chain, who sells it to a thirsty customer. The same 500 ml of milk has been sold several times, but only the last transaction represents part of the state's final demand. Thus, it can clearly be seen that the inputs required by one industry form part of the demand for the products of another.

There are two major types of Input/Output models: open and closed models. In open models, the labour and wages of employees and the gross operating surplus of companies are treated as primary inputs in the production of goods and services; if you want to produce more widgets, you must employ more widget makers. This type of model captures the direct and indirect effects of changes in demand in one industry on the other industries in the economy. By contrast, RIOM is a closed model that includes the household sector as a separate industry. This enables the consideration of induced effects of changes in demand. Induced impacts reflect the changes in consumer spending resulting from changes in economic activity and therefore in employment. The household sector is considered as an 'industry' whose outputs are labour, and whose inputs consist of consumer spending; if you create more employment, you also create an increase in demand from the household sector for consumer goods like food, accommodation, entertainment and so on.

RIOM applies the Australian Bureau of Statistics Australian 2005-06 transaction tables (ABS, 2008a) in conjunction with Tasmanian demand and employment information to model the impact of changes in demand on the Tasmanian economy, estimating changes in Tasmanian output, employment and gross state product.

The Tasmanian transaction table used in the model identifies 57 industry sectors, as well as SPR. For expenditure allocated to each industry sector a unique multiplier impact is calculated estimating the impact on gross supply, output, gross state product (following the value-added method), employment, wages, imports and taxation. The Leontief multiplier is given here as:

$$(I-X-C)^{-1}SPRE = \Delta O$$

SPRE = vector of SPR expenditure
ΔO = change in total output
X = transaction table of intermediate demand
C = table of induced consumption demand

RIOM contains a multiplier for the sport, gambling and recreational sector which is used for much of the expenditure, but considerable expenditure is also allocated to government administration, other manufacturing, accommodation and other sectors. It is this considered application of an SPR satellite account that sets our analysis apart from previous studies.

The expenditure on SPR and expenditure motivated by SPR thus has an economic impact that includes a combination of increased output by industries directly subject to increased SPR-related demand, increased output by suppliers to those industries and their suppliers, as well as increased output by all industries that have a role in supplying the demand of increased expenditure by households generated by increased wages.

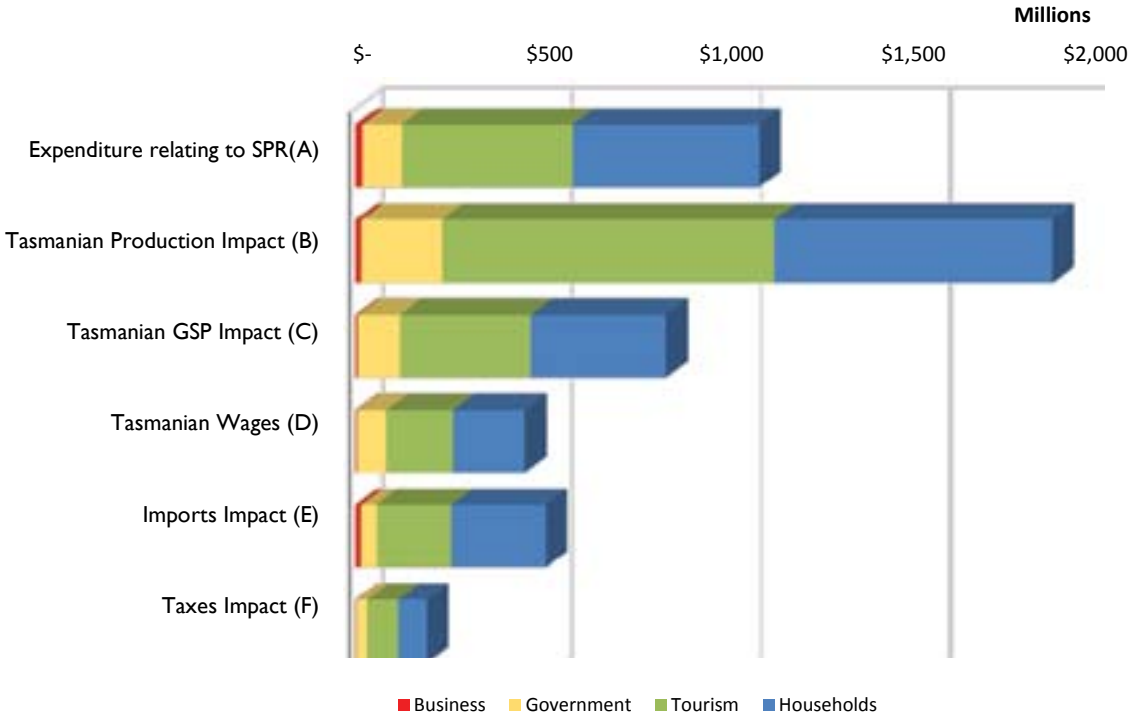
Changes in employment and gross state product (GSP) are proportional to changes in output following the constant return to scale assumption inherent in Input-Output models. A number of the assumptions that underpin the analysis are disclosed here:

- The motivating expenditure for the analysis is the estimated expenditure in 2008-09. Unless explicitly stated and adjusted for, all data is sourced from that period. Tasmania's population as at June 2009 was 502 627 or 2.3% of the whole of Australia population (ABS, 2010b).
- Financial multipliers are calculated using the Tasmanian Regional Input-Output Matrix (RIOM) model. This model is derived from the 2004-05 Australian Input-Output Table adjusted for Tasmanian demand and employment data. Financial multipliers are assumed to be consistent between 2008-09 and 2004-05.
- Employment impacts are estimated using RIOM, with expenditure adjusted for Hobart CPI movement between 2004-05 and 2008-09.
- SPR was a fully-realised and on-going activity within Tasmania in 2008-09. Investment expenditure is limited to items included within federal and state grants, which are assumed to represent typical annual expenditure.
- Household expenditure includes expenditure directly related to and motivated by SPR. The comparative case is that the expenditure would not have taken place in the absence of SPR.
- Impacts are calculated based on direct, indirect (intermediate inputs) and household consumption effects. Increases in gross operating surplus or taxation revenue are not assumed to directly result in increased expenditure in the Tasmanian economy (the government sector is not closed).
- Where demand results in importation of goods or services from outside of Tasmania (interstate or overseas) no further impact is assumed on the Tasmanian economy. No impact of sports demand emanating from the rest of Australia or internationally is assumed other than the tourism export effects noted in the text.

Table 5.6 – The economic impact of SPR in Tasmania ($m) (2008-09)

	Expenditure relating to SPR (A)	Tasmanian Production Impact (B)	Tasmanian GSP Impact (C)	Tasmanian Wages (D)	Imports Impact (E)	Taxes Impact (F)
Business	17.6	14.45	.5	3.0	13.71	.4
Government	103.3	212.61	10.7	77.8	40.7	27.7
Tourism	451.6	878.7	345.9	176.5	199.1	83.0
Households	491.9	734.6	357.1	189.1	247.6	76.3
	1 047.11	**840.3**	**819.3**	**446.5**	**501.2**	**188.4**

Figure 5.8 – The economic impact of SPR in Tasmania (2008-09)



The estimated economic impact of direct SPR-related and SPR-motivated expenditure is shown in *Table 5.6 and Figure 5.8*. The total expenditures used to motivate the analysis are shown in column A and sum to $1.05 billion. In RIOM each type of expenditure is allocated to a specific industry sector for the determination of economic impact. It is estimated that the impact of this expenditure is to increase output in the Tasmanian economy by **$1.84 billion** (column B). This includes the production of intermediate goods as well as imports of $501.2 million, much of which is likely to come from other states in Australia. The expenditure associated with SPR is estimated to generate in the order of 13 000 jobs, both full-time and part-time (see below). Thus the increase in wages, rents, profits and taxes associated with the increase in production is estimated to increase Tasmania's gross state product by **$819.3 million** (compared to an alternative case in which those resources were idle due to a lack of demand).

The monetary estimates are calculated with reference to 2009 dollars. The gross state product of the Tasmanian economy in 2009 was $22.6 billion (ABS, 2009d), so the contribution of SPR-motivated and related expenditure of $819.3 million represents 3.6% or slightly more than one-thirtieth of the Tasmanian economy.

The economic impact of SPR on employment

The expenditure associated with SPR is estimated to generate in the order of 13 000 jobs, both full-time and part-time. The level of Tasmanian employment for 2008-09 was 249 600 (ABS, 2010c). The employment generated by the combined direct and indirect impact of SPR-motivated and related expenditure of 13 067 persons represents approximately 5.2% of the Tasmanian workforce, or one person in 20.

Table 5.7 – The employment impact of SPR in Tasmania (2008-09)

	Tasmanian Employment Impact (persons)
Business	88
Government	1 405
Tourism	6 531
Household	5 043
	13 067

The 2006 Census, on which these employment findings are based, showed that 1 580 people self-reported paid employment within the SPR industry in Tasmania (ABS, 2006b). This would suggest that nearly 11 500 jobs are indirectly created by SPR. The extent to which these jobs are distributed by industry can also be inferred from *Table 5.7*.

It is finally noted that this is on top of the 1 791 full-time equivalent positions donated through volunteering. The real wage effect of replacing these voluntary hours is considered earlier in this report (see *Civic benefits*).

The economic impact of SPR on government

It is observed in *Table 5.6* that the estimate of taxes generated by SPR-related or motivated expenditure is **$188.4 million.** This estimate is higher than the identified expenditure by all levels of government on Tasmanian SPR of $103.3 million.

Fiscally, therefore, the sector pays for itself. To the extent that the government expenditure enables other SPR-related and motivated expenditure by households and SPR tourism event participants, it is recognised that SPR-related public expenditure generates a positive return. It is however, noted that the taxation revenue that accrues from SPR is unlikely to be distributed equitably to those tiers of government that invest in it. In other words, whereas the commonwealth government contributes less than 10% of cost of government expenditure on SPR in Tasmania, their share of taxation revenue—through income tax and GST alone— is likely to be much higher.

The likely size of SPR household and tourism expenditure in the absence of government support (to determine whether, at the margin, government expenditure generates a net fiscal benefit) is hypothesised in the section on *The value of SPR to Tasmania.*

The economic impact of SPR on businesses

Tasmanian firms also enjoy a net commercial benefit as a result of SPR. In equilibrium, this surplus represents the fair return to providers of capital which will be just sufficient to cover the cost of investment and the opportunity cost of the use of land or buildings for other purposes. It should be noted, though, that this is fundamentally a short-run concept in competitive markets. In the long-run, economic profits (profits in excess of the cost of capital) would generate new entrants that reduce profitability to normal.

The GSP impact is the gross output less the cost of inputs; this may also be referred to as the Gross Value Added (GVA) to Tasmania. This is reported in Table 5.6 at Column C to be $819.3 million. If we discount this by the cost of labour, or wages (Table 5.6, Column D – $446.5 million), we are left with a theoretical surplus to firms of **$372.8 million**. As mentioned in the previous discussion of impacts on government, **$188.4 million** of this is returned in the form of taxes, with the balance of $184.4 million retained by businesses as profit.

Leisure benefits

To this point, we have identified and, where possible, quantified SPR outputs that change the value of an individual's wellbeing and productivity, as well our civic systems and the broader economy. In this section we ask how much is the intrinsic satisfaction or pleasure that participants derive from their SPR participation worth?

When consumers engage in SPR or purchase a good relating to SPR they are assumed to derive some benefit from the decision. A rational economic framework imposes the assumption that decision-makers are acting to maximise utility in some fashion and do not intentionally make decisions that reduce this. Therefore, for each act of participation or consumption, there is assumed to be a gross benefit (or gross consumer surplus) attaching to that action or consumption.

At the very least, the gross benefit is equal to their expenditure on the items concerned. The revealed preference framework can therefore be applied to identify the minimum benefits associated with SPR expenditure; in this case, the $491.9 million identified as household expenditure in the section on Current costs.

Yet how much would consumers–even non-participants—be willing to pay above and beyond this amount for the full set of benefits that might accrue to them from regular participation in SPR? Or how much would you have to pay someone to give up their SPR participation? And what of the equivalent benefits that accrue to volunteers? Or spectators? In this section we identify an annual leisure surplus of **$4.0 billion** attributable to SPR in Tasmania (at 2008-09 prices).

Figure 5.9 – Leisure benefits in the SPR value model

Participation

Net consumer surplus, commonly called consumer surplus, is the net benefit or additional utility an individual receives in excess of the cost associated with an activity or act of consumption. In many cases (net) consumer surplus is an important benefit in calculating the net costs or benefits of an activity. Determining the consumer surplus associated with SPR participation involves an extension of the revealed preference method known as contingent valuation. Primarily used to value public goods, such as environmental assets, it is used here to derive a demand function for SPR.

The willingness of participants to travel various distances to attend or participate in SPR (the travel cost method) is occasionally used in the SPR literature to value discrete activities or events (Cooke, 1993; Loomis et al., 2009; Peterson & Arnold, 1987). However, because the choice to participate in SPR may involve no travel—after all, a person can do sit-ups lying in bed—it is inappropriate for our holistic study. Although the travel cost method may be appropriate for valuing scarce resources that people are willing to travel long distances for, when applied over short distances the discrete values of sports, retail and community infrastructure cannot be distinguished.

We have instead adopted the more widely used willingness to pay (WTP) and willingness to accept (WTA) methods. Where an individual would have been willing to pay an additional sum to participate in SPR, but does not, then that difference can be considered the net consumer surplus deriving from the activity. The amount a person would be willing to accept to forego an activity in which they do participate (and all the benefits that might accrue from it) is an alternate measure of the same outcome.

In March 2010 we commissioned Newspoll to conduct a national telephone survey (n = 1201) to resolve this conundrum. The following question (WTP) was asked, with emphases included:

> "Imagine there was a pill you could take **once a week,** and it gave you all of the physical and social benefits of **regular** participation in sport and physical recreation. How much, if anything, would you be prepared to **pay** for **each** of those pills?"

A follow-up question (WTA) was asked only of respondents who did at least occasionally participate in SPR:

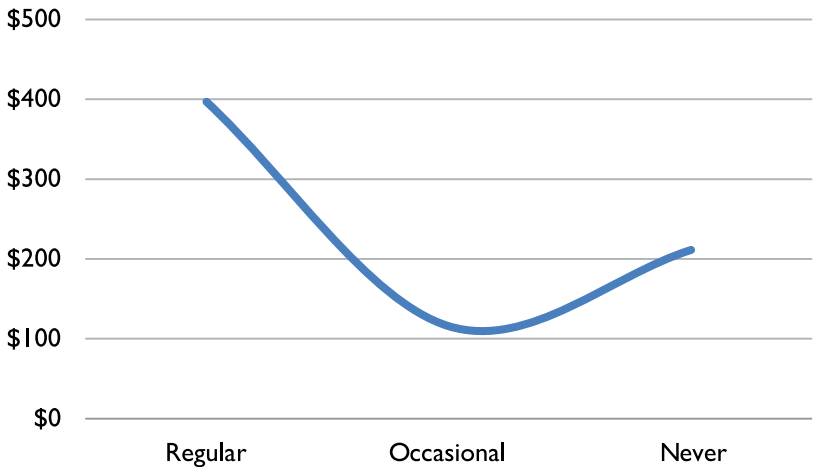
> "What would you have to be paid to give up one year of sport and physical recreation? In other words, you would lose all of the physical and social benefits of your current participation."

A detailed explanation of the method used can be found at *Appendix 7*. Self-reported participation was verified against the ERASS participation data used throughout this report, and a high degree of congruence was found across all demographic variables.

Table 5.8 – Weekly consumer surplus of SPR participation in Tasmania (2008-09)

Participation	Willingness to pay	Willingness to accept
Regular	$397	$ 10 641
Occasional	$116	$ 9 663
Never	$211	NA

Figure 5.10 – Weekly willingness to pay for the benefits of SPR participation



This result is noteworthy for two reasons. In the first instance, it appears that occasional participants place a much lower value on their participation than regular participants. This is consistent with the analysis presented earlier in this report that the significant health and workplace benefits of SPR participation do not accrue until the threshold of regular participation is met. In other words, it is theorised that the higher value placed on SPR by regular participants reflects an intuitive appreciation of the additional benefits that flow to them.

Therefore, in order to value the benefits in leisure of SPR participation, the statewide, gross consumer surplus of $4.7 billion (WTP) must be discounted by the previously quantified benefits that are known to attach directly to the participant. This would be the sum of VSLY health benefits ($718.4 million) and productivity (wage) enhancements ($182.0 million). Note that the absentee-enabled bonuses described earlier accrue to producers—as opposed to employees—and are not discounted here. To that end, the annual leisure benefit of SPR participation by Tasmanians can be valued in 2008-09 at **$3.85 billion** using the willingness to pay method. Using the willingness to accept method, this figure is $3 374.2 billion, or nearly 1,000 times the WTP value.

Despite the theoretical inconsistency between the WTP and WTA totals, the disparity is not unusual (Horowitz & McConnell, 2002). Although our research intention may have been frustrated by the limitations of the survey (see Appendix 9), it has been observed elsewhere that individuals may be loss-averse. In other words, the prospect of losing an entitlement weighs more heavily than the prospect of gaining a privilege (Sayman & Öncüler, 2005). For whereas a WTP valuation simulates a simple purchasing decision, a WTA valuation simulates the need to purchase a substitute for a good or service about to be denied. Goods like SPR with fewer substitutes are more difficult to replace and may therefore require disproportionately more money as compensation (Hanemann, 1991; Whynes & Sach, 2007). This is evidenced in the extremely high number of respondents (45.8%) who reported that they would not give up their SPR participation 'for any cost'.

Unfortunately, the majority of economists prefer the WTP method, even though this is an imperfect rationale for making decisions in public policy. After all, valuing SPR in WTP terms leaves a default implication that there is a ready substitute for it. Our WTA findings clearly argue against this, as does the very high incidence of people who reported being unwilling to substitute their SPR by either method (see *Appendix 9*).

The other risk is that in the market for ordinary goods, a large gap between WTP and ticket price suggests an opportunity to increase the retail value (converting the consumer's surplus into a profit for the producer). For government, such a large gap might be seen as an incentive to withdraw subsidy for SPR on the mistaken rationale that users are prepared to pay that much more for it regardless. Yet if that were the case, we would already be seeing optimal participation, especially given that non-users already value SPR at a rate much greater than the cost of regular participation. This rationale also neglects the fact that the revocation of SPR services would trigger a desire for compensation in users, thus defining public perception in terms of WTA. In those circumstances, only those goods with a higher WTA ratio would be viewed as acceptable public spending alternatives.

In this report we bind ourselves to convention, and report the figure of **$3.8 billion** as the 'real' value of the satisfaction in leisure that Tasmanians derive from SPR as a discrete activity. As the presently preferred instrument of policy, using WTP should offer better comparability with like research. Despite this, we recommend a deliberative approach to decision making that considers all available data, and not just the still subjective templates of economic impact and cost benefit analyses (Barget & Gouguet, 2007). This would include an appreciation of SPR in terms of its WTA value, and other values unquantified or underestimated by this report.

The other interesting observation that can be made from the survey data is that non-participants place a value on the regular benefits of SPR participation that is well in excess of the costs (the current and opportunity costs to the individual of regular participation in SPR are estimated to be less than $100.00 per week).

The fact that they would be willing to pay twice this amount—but do not—suggests that the non-financial barriers to SPR participation for this group are significant. It may also indicate that they are either content to subsidise the regular participation of others (in return for the sum of community benefits enabled), and/or they are valuing their option to participate in SPR at a later date (SGS Economics and Planning, 2010).

Volunteering

Participants are not the only actors in SPR who receive satisfaction from their pursuits in leisure. Volunteers are also likely to derive a quantifiable welfare surplus from their activities. In the context of the SPR value analysis, this requires relaxing the assumption that all decision makers are selfish, and allow individuals to have altruistic purposes. Altruism can however, be seen to be rational from a communal perspective. That is, volunteers and others who donate believe that they are acting in the common good towards a Pareto optimal outcome (see the next section), even though they are not personally compensated.

An appropriate WTA question of volunteers might be, 'How much would your employer need to pay you to give up one hour of the time you volunteer towards SPR?' From this, we could use the method applied above to estimate the gross leisure benefit of SPR volunteering.

Our research could not extend to include WTP/WTA research into the consumer surplus that might attach to volunteering; and we recommend this as a direction for future inquiry. However, we are unwilling to accept that there is no benefit in leisure to SPR volunteers. An earlier section of this report estimated that the statewide opportunity cost of SPR volunteering in 2008-09 was $36.8 million. At no other point do we value the benefits that may accrue to individual volunteers, although the civic benefit of their contribution is estimated to be $107.7 million.

The satisfaction that SPR volunteers receive from their contribution is conservatively estimated here using the revealed preference method. That volunteers donate $36.8 million-worth of time makes it likely that they receive at least this much satisfaction from the activity. The survey results on participation (above) suggest that that using **$36.8 million** as a proxy for the leisure surplus is likely to underestimate the true value.

SPR as a public good

Another civic benefit of SPR is the positive impact of high profile sporting events (and victories) on consumer confidence and regional standing. Not only can such achievements bring communities together (Chalip, 2006; Parry & Malcolm, 2004)— indeed, sport is identified in many countries as the most important element contributing to how citizens feel about their nation (Kelley & Evans, 1998) – the profile of the community is raised (DeChano & Shelley, 2004) and even a positive effect on stock markets can be discerned (Ashton, Gerrard, & Hudson, 2003). This cultural benefit can also be localised, with SPR being utilised in Australian Aboriginal communities to, among other things, strengthen cultural identity and restore community pride (Hoeber, 2008; Mulholland, 2008); while, the important place of female sporting role models is a consistent theme in literature (Giuliano, Turner, Lundquist, & Knight, 2007).

The term 'community wellbeing' encompasses a broad range of economic, social, cultural and governance goals and priorities (Cox, Frere, West, & Wiseman, 2010), a number of which have been identified here. The Australian Unity Wellbeing Index is an academically rigorous longitudinal examination of self-reported community wellbeing. While the index is relatively stable, sporting achievements (such as Olympic Games)

appear to be one of a few factors associated with significant shifts between surveys (Frontier Economics, 2010), suggesting that identification with sporting success is a determinant of wellbeing.

The Index has also identified a strong relationship between wellbeing and a person's health (Cummins et al., 2004), while observing that the threshold for optimal wellbeing is exercising three days per week—our own threshold for regular participation (Cummins et al., 2008). Yet the marginal effect on wellbeing of SPR participation is discretely estimated using more reliable means elsewhere in this report.

The valuation of community wellbeing intended here is an economic appreciation of SPR as a public good. A public good is something that can be enjoyed equally by all without any diminution of its worth; private goods, on the other hand (such as meat pies) have a finite utility. SPR participation is a private good, in that the benefits largely flow to the individual, and the repercussions have a diminishing return.

The question is thus posed: what percent of Tasmania's community wellbeing is attributable to the shared utility of SPR, above and beyond its functional impact? Ideally, we could correlate life satisfaction with a person's non-participative engagement with SPR (Frey, Luechinger, & Stutzer, 2004), and to some extent the literature on sports fandom does this (Wann, Keenan, & Page, 2009). In this instance, we conservatively fix 2% as the base effect of SPR identification on community wellbeing in Tasmania. This value would not fluctuate with the short-term (and somewhat volatile) participation rate; however, significant events, such as the establishment of a new professional sports team in the state, would give cause to revise it, especially if a permanent change in wellbeing was observed. Further research in this regard would be illuminating.

Separately estimated is the cost of a permanent movement of a single percentage point on the scale (Australian Unity, 2007), which would come at an average of $27 722 per Tasmanian household in 2008-09. The value of SPR's contribution to Tasmania's community wellbeing is thus estimated to be **$115.3 million.** Once again, we encourage specific contingent valuation research, using the WTP and WTA methodologies, to validate this figure.

The sum of participation, volunteering and public good benefits of SPR—above and beyond those captured elsewhere in this report— are therefore estimated to be worth **$3 997.4 million**.

6. The value of SPR to Tasmania

To this point we have systematically located and mapped the sources of SPR value and, to the extent that it is possible, quantified them in the context of the Tasmanian experience of 2008-09. The impacts of direct spending on SPR have also been analysed using a unique Tasmanian model that is consistent with the best practices of economic impact analysis (see Commercial benefits).

An underappreciated shortcoming of economic impact analysis, however, is that it does not distinguish costs from benefits. For example, expenditure on SPR-related injury is seen as a 'positive' economic impact, in that it creates spending and employment in the health services sector; however, injury in any form is ultimately a burden to the individual and society. Similarly, economic impact studies cannot be used to show the impact of SPR on less tangible community outcomes such as productivity and our system of criminal justice. It is for this reason that economic impact analyses more often than not fail to influence mature policy decisions.

Cost-benefit analysis (CBA) is now the government-preferred approach to evaluating policy choices (DFA, 2006). Our consideration of the economic costs and benefits of SPR as an entity using the CBA framework is the first of its kind. This 'profit and loss' approach will allow decision makers to compare the return on public and other forms of investment in SPR with alternate investment options.

We find here that although the current levels of investment in SPR yield a strong return, a more economically efficient outcome can be achieved by increasing the regular rate of participation, especially at the expense of non-participants. It is proposed that the model developed throughout this report is a useful tool for enabling and explaining CBA, and for evaluating SPR policy alternatives.

Figure 6.1 – The value of sport and physical recreation

The economic assessment of SPR activities has typically focused on statements of economic impact such as increases in spending and employment associated with new visitor and infrastructure spending. For example, a recent estimate of the impact of an Australian FIFA World Cup in 2018 suggested that $5.4 billion of economic activity would follow (Hall, 2008). This method, however, has been subject to significant criticism—particularly in policy—for its failure to recognise, among other things, the effects of spending substitution and leakage (Access Economics, 2009).

A cost-benefit approach, by contrast, is required to identify the opportunity cost associated with expenditure, as well as the costs and benefits that may accrue to society or the environment. The cost-benefit approach also requires particular attention to the identification of recipients of benefits or the bearers of costs. In developing and applying a framework for the assessment of SPR, it is therefore necessary to identify:

- costs and benefits to government at all levels,
- costs and benefits to SPR participants,
- costs and benefits to SPR consumers,
- costs and benefits to the SPR sector, and
- costs and benefits to the community, environment and society.

This is the first known cost-benefit analysis of sport and physical recreation as an entire system within a defined region. It is as much an exploratory study connecting a number of theoretical paradigms under the rubric of CBA as it is a conclusive investigation into known or verifiable economic 'facts'. Future research that might continue the development of this work is thus encouraged.

The assumptions that underpin our cost-benefit analysis are disclosed here:

- The social cost of goods and services is estimated based on their financial cost. It is therefore assumed that goods and services are produced in competitive markets where the marginal social cost is equal to the market price. This means markets are efficient in the absence of monopoly power. This approach is generally conservative as it will overestimate social costs.
- The timeframe for analysis is the financial year 1 July 2008 to 30 June 2009. Unless explicitly stated and adjusted for, all data is sourced from that period. Tasmania's population as at June 2009 was 502 627 or 2.3% of the whole of Australia population (ABS, 2010b).
- Where estimates of value are subjective, the preference of the authors has been to overestimate impacts and costs and underestimate benefits.
    - This is especially observable where we consider the opportunity cost of all SPR participation, but only benefits that are enabled by regular SPR participation.

In Table 6.1 we report the costs and benefits by recipient category to arrive at a net estimate of the welfare benefit of SPR to Tasmania in 2008-09 of **$4.3 billion**.

Table 6.1 – The costs and benefits of SPR in Tasmania ($m) (2008-09)

Costs			
Current			
Households	$491.9		
Government	$103.6		
Businesses	$17.6	$613.1	
Opportunity			
Participation	$609.9		
Volunteering	$36.8		
Assets	$32.2	$678.8	$ 1 291.9
Benefits			
Individuals			
Health	$718.4		
Productivity	$182.0		
Leisure	$ 3 997.4	$ 4 897.8	
Government			
Civic	$207.7		
Commercial (taxes)	$188.4	$396.1	
Businesses			
Productivity	$129.6		
Commercial (profit)	$184.4	$314.0	$ 5 607.9
Net welfare benefit			**$ 4 316.0**

For every *$1.00* invested in SPR, Tasmanians enjoy well over *$4.00* in benefits.

It has already been established that the taxation revenue enjoyed by government more than off-sets the amount it actually spends on SPR. This analysis shows that their annual investment of around $100 million is repaid a staggering **50 times over** in welfare returns to the community. Furthermore, the opportunity cost of *all* the hours donated by individuals to SPR (including occasional participants and volunteers) is more than compensated for by the value of life contribution of *regular* participants.

This leads us to the observation that occasional participants (those who do participate, but insufficiently) represent a significant opportunity cost. It is only when they are inspired to regular participation that the full potential of their SPR labour is realised. Although this is as much an outcome of our method, it must be appreciated that in order to maximise the investment return on SPR programs that target physical activity in leisure must set their minimum participative threshold at the NPAG guidelines for sufficiency.

At the margin

The Australian Government's Department of Finance and Deregulation (Office of Best Practice Regulation) succinctly summarises the purpose of cost-benefit analysis.

> Ideally, all government policies would improve the welfare of society. A policy that made at least some people better-off, while making nobody worse-off, would unambiguously improve social welfare; in economic theory such a policy is termed Pareto efficient. However, in reality such policies rarely exist, and a requirement for Pareto efficiency would result in policy inertia. A more practical requirement is that a policy should only be implemented when those who gain from the policy could compensate those who lose, and still be better off. Such a policy is said to offer a potential Pareto improvement.
>
> The aim of cost-benefit analysis (CBA) is to provide a framework for assessing the ability of a project or regulation to offer a potential Pareto improvement. If the benefits are greater than the costs—if there is a net social benefit—then in theory the gainers from the proposal would be able to compensate the losers and still be better-off, and the policy represents a potential Pareto improvement (OBPR, 2005).

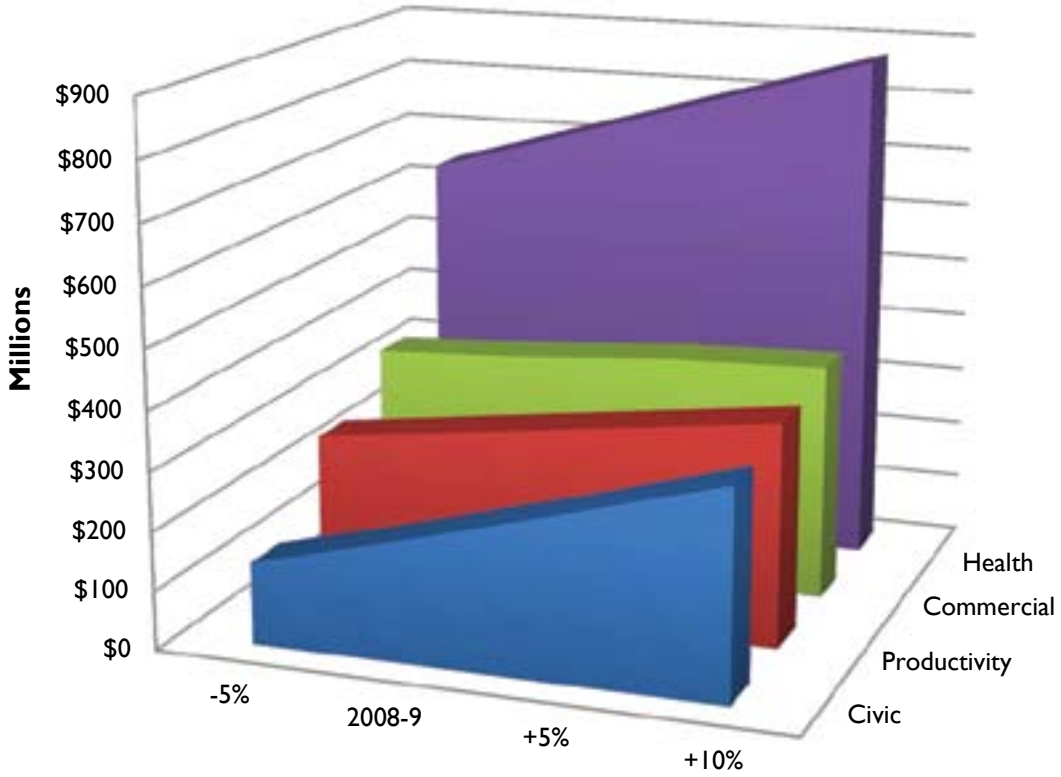
Having established that SPR delivers a net social benefit, the question that remains is whether or not Tasmanians are receiving the optimal (or most Pareto efficient) benefit from their SPR.

The variable on which SPR value most keenly depends is the rate of regular participation. It would therefore to be useful to hypothesise what might occur if that variable were to change. It has been proposed elsewhere that the feasible reduction in prevalence of physical inactivity that might accrue from effective public health approaches is in the region of 5%–10%, or alternatively around 1% per year (Bellew, 1997; Russell, Jensen, & Sullivan, 1993). Another recent study estimated that population-level intervention could be expected to reduce prevalence rates of inactivity by 2% and obesity by 3% points over 5 years (Bemelmans et al., 2008). Overall, reductions in prevalence of inactivity of 1% per year or 10% on a medium-term basis appear achievable, and targets of this magnitude have been used by others; for example, Katzmarzyk et al (2000) and Stephenson et al (2000). A 10% point reduction was selected as an ideal target for a feasible reduction in physical inactivity in a recent economic study by Vic Health (Cadilhac et al., 2009), and this report continues that approach.

Figure 6.2 illustrates (in 2008-09 dollars) the beneficial outcome of -5, +5 and +10 percentage point changes in the rate of regular participation and, concurrently, the number of SPR volunteers.

What can be seen is that increasing the regular rates of SPR participation and volunteering is likely to have an exponential impact on the welfare of society. Because market forces have apparently settled upon the reported rates of household and business expenditure in SPR, it is theorised that a significant change in regular participation can only be effected by stimulus from the government. Therefore the final question advanced by this report is: how much should the government be willing spend to approach Pareto efficiency?

Figure 6.2 – The impact on benefits of changes in the rate of SPR participation ($m)



	-5%2	008-9+	5%	+10%
Civic	138.8	207.7$	280.2$	355.1
Productivity	276.6	311.6$	345.4$	379.2
Commercial	359.2	372.8$	393.0$	401.5
Health	641.3	718.4$	795.5$	872.6

Two scenarios are considered:

Option 1: There is no change in SPR rates of participation or volunteering over the next ten years.
Option 2: Over the next 10 years, regular participation in Tasmanian SPR increases from 46.6% to 56.6% and the rate of SPR volunteering increases from 9.0% to 19.0%.

Table 6.2 illustrates the final impact (in 2008-09 dollars) of a 10 percentage point increase in the regular rates of SPR participation and volunteering. For the purposes of this exercise, government expenditure and the opportunity cost of (public) infrastructure have been held constant.

Table 6.2 – The projected costs and benefits of SPR in Tasmania (+10%)($m)

Costs			
Current			
Households	$561.2		
Businesses	$17.6		
Government	$103.6	$682.1	
Opportunity			
Participation	$675.5		
Volunteering	$73.8		
Assets	$32.2	$781.5	$ 1 463.6
Benefits			
Individuals			
Health	$872.6		
Productivity	$221.5		
Leisure	$ 4 676.6	$ 5 770.6	
Government			
Civic	$355.1		
Commercial (taxes)	$203.5	558.5	
Businesses			
Productivity	$157.7		
Commercial (profit)	$198.0	$355.8	$ 6 684.9
Net welfare benefit			**$ 5 221.3**

On this basis, Option 2 yields a net welfare benefit **$905.3 million** greater than the present situation (Option 1 – *Table 6.1*). Relaxing the budget constraint, this is the theoretical maximum amount that all tiers of government could additionally spend per year once the +10% target is achieved, with no loss to the welfare of the community. Obviously, the difference between this theoretical maximum and their actual spend to achieve this target would be returned to the community as an additional welfare benefit.

Net Present Value

Costs and benefits should nonetheless be valued at the specific time that they occur. Because a dollar's consumption in the future is usually valued less than a dollar's consumption today, future costs and benefits are discounted to a 'present value' (DFA, 2006). The Net Present Value (NPV) of a project or regulation is the present value of estimated benefits minus costs. In mathematical terms, it is expressed as:

$$NPV=\sum_{t=1}^{n}\frac{(B_t-C_t)}{(1+r)^t}$$

Bt = benefit in year t
Ct = cost in year t
r = discount rate

We suggested earlier that it is feasible for society to aspire to a 10% reduction in the rate of physical inactivity, at the rate of 1% per year. Although some benefits of this scenario are likely to be realised immediately (including the commercial benefits previously described and the increase in value delivered by volunteers (as a civic benefit)); productivity, health, leisure and the other civic benefits are more likely to be realised incrementally. This is because the SPR capital required to achieve them will take time to accrue and convert.

Studies suggest, however, that there appears to be a relatively short time lag between increasing physical activity and observing the benefits (Blair et al., 1995; Paffenbarger et al., 1993). Blair et al (1995) demonstrated that the effect of becoming active conferred a benefit on cardiovascular and all-cause mortality more rapidly that modifying other risk factors. For example, increasing activity reduced all-cause mortality within two years, which was half the time required to see benefits from smoking cessation (Cadilhac et al., 2009).

Furthermore, because we are now considering the long-term impact of events, the cost of assets consumed in the delivery of SPR must be allowed for. In the Opportunity cost section, the value of government-owned SPR capital in Tasmania was estimated to be $1.6 billion (from which a long-run cost of $32.2 million was calculated). As the stock of privately held SPR capital cannot be reliably aggregated, we apply the distribution of public versus private capital in the non-dwelling construction and machinery and equipment sectors (Mikhailitchenko, Nguyen, & Smith, 2005) to estimate the total stock of SPR infrastructure in the state to be worth $3.1 billion.

Although the present depreciation rate of SPR assets is unknown, between 1983 and 1995 (the last period for which this data was reported) Culture and Recreation Services capital was consumed at an annual average rate of 5.2% (with a 95% CI of 0.11%) (ABS, 1997). Using this figure would have us assume that $160.2 million of SPR capital was consumed in Tasmania in 2008-09. Because this capital would need to be refreshed over the timeframe in question, this figure has been added to each year's costs.

Finally, in the section on Opportunity cost, we identified a discount rate of 2.0%. Discounting the costs and benefits of each scenario at this rate over 10 years reveals the net present values of the Options 1 and 2 of Table 6.3. To test the sensitivity of our assumption about the realisation of benefits, we additionally consider three year and five year maturities.

In general, the decision rule when using NPV is:

- accept a policy only if NPV>0; and
- in deciding between alternative policies, select the one with the highest NPV (OBPR, 2005)

As expected, the NPV of Option 2 (+10%) is greater than Option 1, making it the preferred option for policy. The difference between the two values is $3.9 billion over 10 years, implying that the three tiers of government could effectively invest an **additional $386.5 million per year** into Tasmanian SPR to achieve the targets of Option 2 without any loss to the welfare benefit presently received. Given a current government expenditure on SPR in Tasmania of $103.6 million, it is more likely than not that the three tiers of government could comfortably achieve the +10% target, delivering an exponential surplus to the community.

Table 6.3 – The NPV of changes in the rates of SPR engagement over 10 years ($m)

Time to full realisation of benefits	*2 years*	*3 years*	*5 years*
Option 1	$ 37 328.9	$ 37 328.9	$ 37 328.9
Option 2 (+10%)	$ 41 193.9	$ 40 686.5	$ 40 084.8
Net benefit (Option 2 – Option 1)	$ 3 864.9	$ 3 357.6	$ 2 755.9

Stimulus

Because physical inactivity is a societal problem, national physical activity policies that are integrated, evidence-based, population-focused, equity-oriented and multi-sectoral—supported by a clear political commitment at all governmental levels—are necessary (Schöppe, Bauman, & Bull, 2004). Specific contingency analysis of the strategic investment alternatives would need to undertaken before recommendations as to the efficiency of various interventions could be made.

For that reason, this report stops short of proposing how such an investment might be distributed (or efficiently employed); suffice to say, it would be disappointing in the extreme if increasing by nearly four-fold the current allocation to SPR in Tasmania could not induce a 10% change in participant and volunteer behaviour. A number of international studies point to how this might be achieved.

In their Cochrane review, Foster et al (2005) found that in 19 studies involving over 7 000 participants physical activity interventions had a consistently positive effect on self-reported physical activity, on achieving a predetermined level of physical activity, and on cardio-respiratory fitness. A separate review of 38 studies of home-based, group-based or educational interventions in older adults found physical activity was consistently increased in the short term (van der Bij, Laurant, & Wensing, 2002).

This is comparable with the findings of Kahn et al (2002), who identified 6 studies on community-wide SPR campaigns, observing a median net increase of 4.2% in physical activity. Two informational interventions ('point-of-decision' prompts to encourage stair use and community-wide campaigns) were effective, as were three behavioural and social interventions (school-based physical education, social support in community settings, and individually-adapted health behaviour change) and one environmental and policy intervention (creation of or enhanced access to places for physical activity combined with informational outreach activities).

In each instance, the cost of intervention was no more than a fraction of existing SPR investment. Therefore we conclusively state that despite the benefits currently delivered to Tasmanians, the welfare potential of SPR is yet to be optimally realised.

7. Conclusion

The findings of this study largely speak for themselves. If you could absolutely guarantee a minimum annual return of over 400% on every dollar invested commercially, then there would be a run on the banks tomorrow. Yet although this result may be cause for celebration amongst advocates for SPR, the full potential of the industry is yet to be realised.

It is beyond the brief of this project to make recommendations as to how government investment in SPR can be made more efficient. That would require the application of our model to specific programs and policy contingencies. The results reported however, reveal a number of conclusions that should be of particular interest to public policy.

On the participative side, just over half of the Tasmanian population aged 15 years and over are not sufficiently active in SPR to receive the full health benefits of participation. The gap between male and female rates of regular participation should also be of concern. Furthermore, our current system of SPR critically depends as much on the contribution of volunteers as it does on the largesse of government; therefore, sustaining and enlarging this base should be a continuing priority in the delivery of SPR services.

From the perspective of economic impact, we challenge the conventional wisdom in demonstrating that participative SPR is of far more significance to the welfare of the community than the discrete economic impacts of elite sport. The taxation revenue that governments earn from SPR is also greater than the money they spend on the same—even if these returns are disproportionally allocated. SPR is an industry that influences economic activity across almost the entire spectrum of government and commercial interests. To that end, there should be a concerted effort to more efficiently share the resources and knowledge embedded in SPR throughout society.

Our cost-benefit analysis has also shown that because the external benefits of SPR exceed the social costs, the outcome is not inefficient. The effect of volunteer and government subsidies is to reduce the cost to participants of engaging in SPR. The reduction in price moves participation closer to the level that could be achieved where individuals are able to fully internalise the external benefits of sport to health, life expectancy and social capital. However, the marginal analysis hypothesises that enlarging government investment in SPR will yield an exponential return, thereby moving the SPR economy closer to a Pareto efficient outcome.

This study has ultimately examined whether those who donate their time and money to SPR are supporting the common good. Our hope for this report is that it educates readers to the economically real and significant value of sport and physical recreation. All too often, advocates of SPR are accused of being evangelists, appealing to the intuition of their audience in the absence of economic reason. Yet even if some of the findings herein are to be contested, we would argue that this report is a major step towards filling a gap in the debate for (or against) sport and physical recreation. Although there are a number of limitations to our findings that would benefit from future research, the potential now exists for decision makers in both industry and government to leverage this framework for continual improvement in the marketing and delivery of their services.

8. Opportunities for future research

This study has identified a number of gaps in our understanding of the empirical impacts of SPR in both Tasmania and around the world. Future research is therefore encouraged in the following areas:

- Tasmanian participation and volunteering in SPR including:
    - sub-regional and other demographic drivers
    - motivations for and constraints to participation.
- 'Sufficient' participation in SPR (and its relationship to regular participation).
- Participation in SPR by minors, and the antecedent costs and benefits.
- The role of professional sports in motivating engagement with SPR.
- Household expenditure on SPR (particularly in indirect categories).
- Business expenditure on employee welfare through SPR.
- The surpluses enjoyed by businesses who invest in employee SPR.
- Population attributable rates of inactivity for other disease states where there is a strong causal link between them and SPR participation (for example sexually transmitted disease, drug and alcohol addiction).
- SPR-related export activity.
- Regional brand value leveraged by SPR including:
    - replacement cost of media content
    - impacts on consumer behaviour.
- The environmental costs and benefits of SPR.
- Quantitative research into the workplace productivity benefits enabled by SPR.
- The contribution of SPR innovation to society.
- The impact of SPR identification on community wellbeing.
- The consumer surplus (or value in leisure) of SPR volunteering and spectating.

References

AAP. 2008. Binge drinking fight spotlights sport, The Age, On-Line ed. Melbourne: Fairfax Publishing.

Abbaspour, M., Karbassi, A. R., & Khadivi, S. 2006. Implementation of green management concepts in sport complexes. International Journal of Environmental Science and Technology, 3(3): 213-219.

Abelson. 2007. Establishing a Monetary Value for Lives Saved: Issues and Controversies Working Papers in Cost benefit Analysis WP 2008-2. Canberra: Department of Finance and Deregulation.

ABS. 1993. Australian and New Zealand Standard Industrial Classification (ANZSIC), Vol. 1292.0. Canberra: Australian Bureau of Statistics.

ABS. 1997. Australian National Accounts Capital Stock (1995-96), Vol. 5221.0. Canberra: Australian Bureau of Statistics.

ABS. 2002. Generosity of Australian Businesses (2000-01), Vol. 8157.0. Canberra: Australian Bureau of Statistics.

ABS. 2003. National Health Survey: Injuries, Australia (2001) Vol. 4384.0. Canberra: Australian Bureau of Statistics.

ABS. 2004. Feasibility Study for a Sports and Physical Recreation Satellite Account. Canberra: National Centre for Culture and Recreation Statistics, Australian Bureau of Statistics.

ABS. 2006a. Household Expenditure Survey, Australia: Detailed Expenditure Items, 2003-04 (Reissue) Vol. 6535.0.55.001. Canberra: Australian Bureau of Statistics.

ABS. 2006b. 2006 Census of Population and Housing. Canberra: Australian Bureau of Statistics.

ABS. 2007. Voluntary Work, Australia (2006), Vol. 4441.0. Canberra: Australian Bureau of Statistics.

ABS. 2008a. Australian National Accounts: Input-Output Tables (2004-05), Vol. 5209.0.55.001. Canberra: Australian Bureau of Statistics.

ABS. 2008b. Volunteers in Sport, Australia (2006), Vol. 4440.0.55.001. Canberra: Australian Bureau of Statistics.

ABS. 2009a. Children's Participation in Cultural and Leisure Activities Vol. 4901.0. Canberra: Australian Bureau of Statistics.

ABS. 2009b. Sports and Physical Recreation Services, Australia (2004-5), Vol. 8686.0. Canberra: Australian Bureau of Statistics.

ABS. 2009c. National Health Survey: Summary of Results (2007-2008), Vol. 4364.0. Canberra: Australian Bureau of Statistics.

ABS. 2009d. Australian National Accounts: State Accounts (2008-09), Vol. 5220.0. Canberra: Australian Bureau of Statistics.

ABS. 2010a. Consumer Price Index, Australia, Vol. 6401.0. Canberra: Australian Bureau of Statistics.

ABS. 2010b. Australian Demographic Statistics, Vol. 3101.0. Canberra: Australian Bureau of Statistics.

ABS. 2010c. Tasmanian State & Regional Indicators (December 2009), Vol. 1307.6. Canberra: Australian Bureau of Statistics.

ABS. 2010d. Employee Earnings, Benefits and Trade Union Membership, Australia – Mean Weekly Earnings in Main Job, August 2009 Vol. 6310.0. Canberra: Australian Bureau of Statistics.

Access Economics. 2006. The Economic Costs of Obesity: Diabetes Australia.

Access Economics. 2008. The Growing Cost of Obesity in 2008: Three Years On: Diabetes Australia.

Access Economics. 2009. Let's get physical: The economic contribution of fitness centres in Australia: Fitness Australia.

AIHW. 2000. Australia's Health 2000. Canberra: Australian Institute of Health and Welfare.

AIHW; How much physical activity is sufficient? ; http://www.aihw.gov.au/riskfactors/faqs.cfm#Activity; 30 June, 2010.

AIHW. 2006. Australia's Health 2006. Canberra: Australian Institute of Health and Welfare.

AIHW. 2007. A picture of osteoarthritis in Australia. Canberra: Australian Institute of Health and Welfare.

AIHW. 2008a. Health care expenditure on cardiovascular diseases 2004–05. Canberra: Australian Institute of Health and Welfare.

AIHW. 2008b. Cancer in Australia: an overview, 2008. Canberra: Australian Institute of Health and Welfare.

AIHW. 2009a. Insulin-treated diabetes in Australia 2000-2007. Canberra: Australian Institute of Health and Welfare.

AIHW. 2009b. Health Expenditure Australia, 2007-8. Canberra: Australian Institute of Health and Welfare.

Amara, M., Coalter, F., Aquilina, D., Taylor, J., Argent, E., Betzer-Tayar, M., Green, M., & Henry, I. 2004. The Roles of Sport and Education in the Social Inclusion of Asylum Seekers and Refugees: An Evaluation of Policy and Practice in the UK: Institute of Sport and Leisure Policy, Loughborough University, University of Stirling.

Andersen, L. B. 2004. Relative Risk of Mortality in the Physically Inactive Is Underestimated Because of Real Changes in Exposure Level during Follow-up. American Journal of Epidemiology, 160(2): 189.

Andersson, T. D., Rustad, A., & Solberg, H. A. 2004. Local residents' monetary evaluation of sports events. Managing Leisure, 9(3): 145-158.

ASC. 2009. Annual Report 2008-9. Canberra: Australian Sports Commission.

ASC. 2010. Participation in Exercise, Recreation and Sport. Canberra: Australian Sports Commission.

Ashton, J. K., Gerrard, B., & Hudson, R. 2003. Economic impact of national sporting success: evidence from the London stock exchange. Applied Economics Letters, 10(12): 783-785.

Atherley, K. M. 2006. Sport, localism and social capital in rural Western Australia. Geographical Research, 44(4): 348-360.

ATO. 2010. Australian Taxation Statistics, 2007-8. Canberra: Australian Taxation Office.

Australian Government. 2008. Australian Sport: Emerging Challenges, New Directions.

Australian Unity. 2007. What Makes us Happy? Melbourne: Deakin University.

Bahn, S., Hancock, P., & Cooper, T. 2008. Evaluation of the City of Stirling culturally and linguistically diverse young people sport and recreation project. Perth, WA: Department of Sport and Recreation.

Bailey, R. 2005. Evaluating the relationship between physical education, sport and social inclusion. Educational Review, 57(1): 71-90.

Bailey, R. 2006. Physical Education and Sport in Schools: A Review of Benefits and Outcomes. The Journal of School Health, 76(8): 397.

Bandura. 1971. Social Learning Theory. Morristown NJ: General Learning Press.

Barget, E. & Gouguet, J.-J. 2007. The Total Economic Value of Sporting Events Theory and Practice. Journal of Sports Economics, 8(2): 165-182.

Begg, D. J., Langley, J. D., Moffitt, T., & Marshall, S.W. 1996. Sport and delinquency: an examination of the deterrence hypothesis in a longitudinal study. British Journal of Sports Medicine, 30(4): 335-341.

Begg, S., Vos, T., Barker, B., Stevenson, C., Stanley, L., & Lopez, A. 2007. The Burden of Disease and Injury in Australia, 2003. Canberra: Australian Institute of Health and Welfare.

Bellew, B. 1997. Towards best practice in the promotion of physical activity. New South Wales Public

Health Bulletin, 8(13-16).

Bemelmans, W., van Baal, P., Wendel-Vos, W., Schuit, J., Feskens, E., Ament, A., & Hoogenveen, R. 2008. The costs, effects and cost-effectiveness of counteracting overweight on a population level. A scientific base for policy targets for the Dutch national plan for action. Preventive Medicine, 46(2): 127-132.

Bird, R. B. & Smith, E. A. 2005. Signalling Theory, Strategic Interaction, and Symbolic Capital. Current Anthropology, 46(2): 221-246.

Birrell, S. 1981. Sport as ritual: interpretations from Durkheim to Goffman. Social Forces, 60(2): 354-376.

Blair, S., Kohl, H., Barlow, C., Paffenbarger, R. J., Gibbons, L., & Macera, C. 1995. Changes in physical fitness and all-cause mortality. A prospective study of healthy and unhealthy men. JAMA, 273(14): 1093-1098.

Bourdieu, P. 1986. The forms of capital. In J. Richardson (Ed.), Handbook of theory and research for the sociology of education. New York: Greenwood.

Bourdieu, P. 1993. The Field of Cultural Production. New York: Columbia University Press.

Bournes, D. A. 2000. Concept Inventing: A Process for Creating a Unitary Definition of Having Courage. Nursing Science Quarterly, 13: 143-151.

Bowie, N. E. 1998. A Kantian theory of meaningful work. Journal of Business Ethics, 17(9/10): 1083.

Cadilhac, D., Magnus, A., Cumming, T., Sheppard, L., Pearce, D., & Carter, R. 2009. The health and economic benefits of reducing disease risk factors. Melbourne, Australia: Vic Health.

Cameron, J. & Gidlow, B. 1998. Sociology of Leisure and Sport. In H. C. Perkins & G. Cushman (Eds.), Time Out? Leisure, Recreation and Tourism in New Zealand and Australia. Auckland, NZ: Addison Wesley Longman New Zealand Ltd.

Chalip, L., Green, B. C., & Hill, B. 2003. Effects of sport event media on destination image and intention to visit. Journal of Sport Management, 17(3): 214-234.

Chalip, L. 2006. Towards Social Leverage of Sport Events. Journal of Sport Tourism, 11(2): 109-127.

Coalter, F., Allison, M., & Taylor, J. 2000. The role of sport in regenerating deprived urban areas Edinburgh: The Scottish Executive Central Research Unit.

Coalter, F. 2007. Sports Clubs, Social Capital and Social Regeneration: 'ill-defined interventions with hard to follow outcomes'? Sport in Society, 10(4): 537-559.

Coalter, F. 2008. A Wider Social Role for Sport: Who's Keeping the Score? UK: Routledge.

Coates, D. & Humphreys, B. R. 2003. The effect of professional sports on earning and employment in the services and retail sectors in US cities. Regional Science and Urban Economics, 33(2): 175-198.

Collins, J. J., Baase, C. M., Sharda, C. E., Ozminkowski, R. J., & et al. 2005. The Assessment of Chronic Health Conditions on Work Performance, Absence, and Total Economic Impact for Employers. Journal of Occupational and Environmental Medicine, 47(6): 547.

Cooke, A. 1993. Deriving leisure time values for visitors to urban sports centres. Leisure Studies, 12(3): 221-231.

Cottreau, C., Ness, R., & Kriska, A. 2000. Physical activity and reduced risk of ovarian cancer Obstetrics and Gynecology, 96(4): 609-614.

Cox, D., Frere, M., West, S., & Wiseman, J. 2010. Developing and using local community wellbeing indicators: Learning from the experience of Community Indicators Victoria. Australian Journal of Social Issues, 45(1): 71.

Cummins, R. A., Eckersley, R., Lo, S. K., Okerstrom, E., Woerner, J., & Davern, M. 2004. The Wellbeing of Australians – Health and Body Weight. In Australian Centre on Quality of Life (Ed.), Australian Unity Wellbeing Index,. Melbourne: Deakin University.

Cummins, R.A., Woerner, J., Gibson, A., Lai, L., Weinberg, M., & Collard, J. 2008. The Wellbeing of Australians – Links with Exercise, Nicotine and Alcohol. In Australian Centre on Quality of Life (Ed.), Australian Unity Wellbeing Index,. Melbourne: Deakin University.

Cumps, E., Verhagen, E., Annemans, L., & Meeusen, R. 2008. Injury rate and socioeconomic costs resulting from sports injuries in Flanders: data derived from sports insurance statistics 2003. British Journal of Sports Medicine, 42(9): 767-773.

Cycling South. 2010. Super Tuesday Bicycle Commuter Survey. Hobart: Bicycle Network.

Deakin University. 2007. People, Pets & Planning Symposium, Melbourne.

DeChano, L. M. & Shelley, F. M. 2004. Using Sports to Teach Geography: Examples From Kansas City. The Journal of Geography, 103(5): 185.

DEDTA. 2009. Annual Report 2008-9. Hobart: Department of Economic Development, Tourism and the Arts.

DEDTA. 2010. Tasmanian Visitors Survey. Hobart: Department of Economic Development, Tourism and the Arts.

Demaine, C. & Short, S. E. 2007. Sources of sport confidence and their relationship with sport confidence in college basketball players. Journal of Sport & Exercise Psychology, 29: S157-S157.

Department of Health and Ageing. 2003. Sports Safety in Australia: An Update. Canberra.

DEPHA. 2009. Annual Report 2008-9. Hobart: Department of the Environment, Parks, Heritage and the Arts.

DFA. 2006. Handbook of Cost Benefit Analysis. In Department of Finance and Deregulation (Ed.), Financial Management Reference Material No.6. Canberra: Financial Management Group.

DHAC. 1999. National Physical Activity Guidelines for Adults. Canberra: Department of Health and Aged Care.

DoE. 2009. Annual Report 2008-9. Hobart: Department of Education.

DoJ. 2009. Annual Report 2008-9. Hobart: Department of Justice.

DTF. 2008. Budget Paper 1. Hobart: Department of Treasury and Finance.

Dudwick, N., Kuehnast, K., Jones, V. N., & Woolcock, M. 2006. Analyzing Social Capital in Context: A Guide to Using Qualitative Methods and Data. Washington DC: World Bank.

Econtech. 2007a. Economic Modelling of the Net Costs Associated with Non-Participation in Sport and Physical Inactivity. Canberra: Medibank Private.

Econtech. 2007b. Economic Modelling of the Cost of Presenteeism in Australia. Canberra: Medibank Private.

Egger, G. 1991. Sports Injuries in Australia: Causes, Cost and Prevention. Health Promotion Journal of Australia, 1(2): 28-33.

Etnier, J., Salazar, W., Landers, D., Petruzzello, S., Han, M., & Nowell, P. 1997. The influence of physical fitness and exercise upon cognitive functioning: a meta-analysis Journal of Sport and Exercise Psychology, 19: 249-277.

Farrell, L. & Shields, M. 2004. Playing sport and feeling healthy: evidence from the Health Education Monitoring Study University of Melbourne

Farrell, W., Johnson, J., Sapp, M., Pumphrey, R., & Freeman, S. 1995. Redirecting the lives of urban black males: an assessment of Milwaukee's Midnight Basketball League Journal of Community Practice, 2(4): 91-107.

Flint, J. & Rowlands, R. 2003. Commodification, normalisation and intervention: Cultural, social and symbolic capital in housing consumption and governance. Journal of Housing and the Built Environment, 18(3): 213.

Florida, R. 2002. The Rise of the Creative Class: Why Cities Without Gays and Rock Bands are Losing the Economic Development Race, Washington Monthly.

Foster, C., Hillsdon, M., & Thorogood, M. 2005. Interventions for promoting physical activity. Cochrane

Database of Systematic Reviews.

Fox, K. 1999. The influence of physical activity on mental well-being Public Health Nutrition, 2(3a): 411-418.

France, A. & Roche, M. 1998. Sport mega-events, urban policy and youth identity: issues of citizenship and exclusion in Sheffield, Sport, popular culture and identity.: 139-166.

Frey, B. S., Luechinger, S., & Stutzer, A. 2004. Valuing Public Goods: The Life Satisfaction Approach, CESifo Working Paper Vol. 1158. Zurich.

Friedman, M. T., Andrews, D. L., & Silk, M. L. 2004. Sport and the facade of redevelopment in the postindustrial city. Sociology of Sport Journal, 21(2): 119-139.

Frontier Economics. 2010. The Economic Contribution of Sport to Australia. Sydney: Australian Sports Commission.

Fuller, T. & Tian, Y. 2006. Social and Symbolic Capital and Responsible Entrepreneurship: An Empirical Investigation of SME Narratives. Journal of Business Ethics, 67(3): 287.

Giuliano, T. A., Turner, K. L., Lundquist, J. C., & Knight, J. L. 2007. Gender and the Selection of Public Athletic Role Models. Journal of Sport Behavior, 30(2): 161-198.

Glover, T. D. 2004. The 'community' center and the social construction of citizenship. Leisure Sciences, 26(1): 63-83.

Goodchild, M., Harris, F., Nana, G., & Russell, S. 2000. The Growing Business of Sport and Leisure: The Impact of the Physical Leisure Industry in New Zealand. New Zealand: The Hillary Commission.

Gratton, C., Shibli, S., & Coleman, R. 2005. Sport and economic regeneration in cities. Urban Studies, 42(5-6): 985-999.

Green, M. & Houlihan, B. 2006. Governmentality, Modernization, and the "Disciplining" of National Sporting Organizations: Athletics in Australia and the United Kingdom. Sociology of Sport Journal, 23(1): 47-71.

Griliches, Z. 1967. Hedonic Price Indexes Revisited: Some Notes on the State of the Art. Proceedings of the Business and Economic Statistics Section, American Statistical Association: 324-332.

Griliches, Z. 1971. Hedonic Price Indexes of Automobiles: An Econometric Analysis of Quality Change. In Z. Griliches (Ed.), Price Indexes and Quality Change. Cambridge: Cambridge University Press.

Grootaert, C.; Social Capital: the Missing Link?; http://stats.oecd.org/glossary/detail.asp?ID=3560; 3 July, 2008. Grootaert, C. & Basterlaer, T. v. 2002. Understanding and measuring social capital: A multidisciplinary tool for practitioners. Washingto DC: World Bank. Hall, M. 2008. A Few Billion Reasons to Bid for the 2018 World Cup, Sun-Herald. Sydney: Fairfax.

Hanemann, W. M. 1991. Willingness to pay and willingness to accept: How much can they differ? American Economic Review 81(3): 635-647.

Harvey, J., Levesque, M., & Donnelly, P. 2007. Sport volunteerism and social capital. Sociology of Sport Journal, 24(2): 206-223.

Hassam, A. 2007. Speaking for Australia: Cross-cultural dialogue and international education. Australian Journal of Education, 51(1): 72.

Heuvel, S. G. v. d., Boshuizen, H. C., Hildebrandt, V. H., Blatter, B. M., Ariëns, G. A., & Bongers, P. M. 2005. Effect of sporting activity on absenteeism in a working population British Journal of Sports Medicine, 39(3): 165.

Hiser, J. 1998. Understanding the value of your employees' knowledge. The CPA Journal, 68(7): 56.

Hoeber, L. 2008. Management of Aboriginal volunteers at sport events: implications for recruitment, training and retention, Sport Management Association of Australia & New Zealand. Fremantle, WA.

Horowitz, J. K. & McConnell, K. E. 2002. A Review of WTA/WTP Studies. Journal of Environmental Economics and Management, 44(3): 426-447.

Hudson. 2006. The Impact of Sport on the Workplace. London: Social Issues Research Centre.

IFS. 2009. Annual Report 2008-9. Hobart: Inland Fisheries Service.

ISSP. 2001. Social Relations and Support Systems (Social Networks II): International Social Survey Program.

Jones, S. C., Phillipson, L., & Lynch, M. 2006. Alcohol and sport: can we have one without the other? . Faculty of Health & Behavioural Sciences – Papers, University of Wollongong

Juggins, S. 2000. All in a good cause. Charities are finding increasingly inventive ways of encouraging health club members to raise money. Health Club Management(No. February): 36-37.

Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., Stone, E. J., Rajab, M. W., & Corso, P. 2002. The effectiveness of interventions to increase physical activity: A systematic review. American Journal of Preventive Medicine, 22(4): 73-107.

Kamberidou, I. & Patsadaras, N. 2007. A new concept in European sport governance: sport as social capital. Biology of Exercise, 3: 21-34.

Katzmarzyk, P. T., Gledhill, N., & Shephard, R. J. 2000. The economic burden of physical inactivity in Canada. Canadian Medical Association Journal, 163(11): 1435-1440.

Katzmarzyk, P. T. & Janssen, I. 2004. The economic costs associated with physical inactivity and obesity in Canada: an update. Canadian Journal of Applied Physiology, 29(1): 90-115.

Kavussanu, M. & McAuley, E. 1995. Exercise and Optimism: Are High Active Individuals More Optimistic Than Low Active Ones? Journal of Sport & Exercise Psychology, 17(2): S65-S65.

Kelley, J. & Evans, M. 1998. Sources of national pride in 24 nations. Australian Social Monitor, 2: 23-30.

Keogh, W., Mulvie, A., & Cooper, S. 2005. The identification and application of knowledge capital within small firms. Journal of Small Business and Enterprise Development, 12(1): 76.

Lee, A. & March, A. 2010. Recognising the economic role of bikes: sharing parking in Lygon Street, Carlton Australian Planner, 47: 85-93.

Lloyd, P. J. & Foster, S. L. 2006. Creating healthy, high-performance workplaces strategies from health and sports psychology. Consulting Psychology Journal, 58(1): 23-39.

Long, J. A. & McNamee, M. J. 2004. On the Moral Economy of Racism and Racist Rationalizations in Sport. International Review for the Sociology of Sport, 39(4): 405-420;481.

Loomis, J., Tadjion, O., Watson, P., Wilson, J., Davies, S., & Thilmany, D. 2009. A Hybrid Individual's Zonal Travel Cost Model for Estimating the Consumer Surplus of Golfing in Colorado. Journal of Sports Economics, 10(2): 155-167.

Luthans, F. & Youssef, C. 2004. Human, social, and now positive psychological capital management: Investing in people for competitive advantage. Organizational Dynamics, 33(2): 143-160.

Luthans, F., Avolio, B. J., & Youseff, C. 2007. Psychological Capital: Developing the Human Capital Edge. Oxford, UK: Oxford University Press.

MAST. 2009. Annual Report 2008-9. Hobart: Marine and Safety Tasmania.

Maxfield, S. 2008. Reconciling Corporate Citizenship and Competitive Strategy: Insights from Economic Theory. Journal of Business Ethics, 80(2): 367.

McAuley, E., Jerome, G., Elavsky, S., Marquez, D., & Ramsey, S. 2003. Predicting long-term maintenance of physical activity in older adults. Preventative Medicine, 37: 110-118.

McCormick, J. 2006. Designing against crime. Parks & Recreation, 41(5): 34-39.

Mechling, H. 2005. Physical activity, sport and successful aging. Ko'rperlich-sportliche Aktivita't und erfolgreiches Altern, 48(8): 899-905.

Merkel, U. 2008. The politics of sport diplomacy and reunification in divided Korea. International Review for the Sociology of Sport, 43(3): 289-311.

Merom, D., Bauman, A., & Ford, I. 2004. The public health usefulness of the exercise recreation and sport survey (ERASS) surveillance system. Journal of science and medicine in sport / Sports Medicine Australia, 7(1): 32-37.

Mikhailitchenko, S., Nguyen, D.-T., & Smith, C. 2005. Estimates of Capital Stocks for the States and Territories of Australia, 1985-2004. Economic Analysis and Policy, 33(2): 163-188.

Morris, L., Sallybanks, J., Willis, K., & Makkai, T. 2003. Sport, physical activity and antisocial behaviour in youth Trends and Issues in Crime and Criminal Justice, 249.

Mulholland, E. 2008. What Sport Can Do: The True Sport Report. In T. Sport (Ed.). Ottawa, Canada: Canadian Centre for Ethics in Sport

Murphy, M., Blair, S., & Murtagh, E. 2009. Accumulated versus Continuous Exercise for Health Benefit: A Review of Empirical Studies. Sports Medicine, 39(1): 29.

Narayan, D. & Princhett, L. 1997. Cents and sociability: household income and social capital in rural Tanzania: World Bank Policy Research Working Paper no. 1796.

Nelson, M., Specian, V. L., Tracy, N. C., & DeMello, J. J. 2006. The Effects of Moderate Physical Activity on Offenders in a Rehabilitative Program. Journal of Correctional Education, 57(4): 276.

Nettleton, S. & Hardey, M. 2006. Running away with health: The urban marathon and the construction of 'charitable bodies'. Health, 10(4): 441-460.

Newspoll. 2010. Sport and Recreation Survey, Vol. 100302. Melbourne: Newspoll.

Nichols, G. & Crow, I. 2004. Measuring the impact of crime reduction interventions involving sports activities for young people Howard Journal of Criminal Justice, 43(3): 267-283.

O'Donnell, J. E. 2009. Presenteeism: A Comparative Analysis. University of Massachusetts, Amherst.

O'Reilly, N., Kaplan, A., Rahinel, R., & Nadeau, J. 2008. "If You Can't Win, Why Should I Buy a Ticket?": Hope, Fan Welfare, and Competitive Balance. International Journal of Sport Finance, 3(2): 106-118.

OBPR. 2005. Decision rules in regulatory cost-benefit analysis In Department of Finance and Deregulation (Ed.), Best Practice Regulation Note. Canberra: Office of Best Practice Regulation.

OBPR. 2008. Value of Statistical Life. In Department of Finance and Deregulation (Ed.), Best Practice Regulation Note. Canberra: Office of Best Practice Regulation.

OECD. 2007. Innovation and Growth: Rationale for an Innovation Strategy.

Oldridge, N. B. 2008. Economic burden of physical inactivity: healthcare costs associated with cardiovascular disease. European Journal of Cardiovascular Prevention & Rehabilitation, 15(2): 130-139.

Ozbek, E., Simsek, A., Ilbey, Y., Tascý, A., Tugcu, V., Oztürk, K., Somay, A., Metin, G., & Koc, N. 2008. Regular exercise increases penile endothelial and neuronal nitric oxide synthase activity and serum testosterone levels in aged rats, Congress of the European and International Societies for Sexual Medicine. Brussels, Belgium.

OzTam; Australian Television Audience Measurement; http://www.oztam.com.au/, 30 June, 2010.

Paffenbarger, R. J., Hyde, R., Wing, A., Lee, I., Jung, D., & Kampert, J. 1993. The association of changes in physical-activity level and other lifestyle characteristics with mortality among men. New England Journal of Medicine, 328(8): 538-545.

Page, L. F. & Donohue, R. 2004. Positive Psychological Capital: A Preliminary Exploration of the Construct, Department of Management Working Paper Series. Melbourne: Monash University.

Parry, M. & Malcolm, D. 2004. England's Barmy Army: Commercialization, Masculinity and Nationalism. International Review for the Sociology of Sport, 39(1): 75-94;106-107;109.

Pastoriza, D., Ariño, M. A., & Ricart, J. E. 2008. Ethical Managerial Behaviour as an Antecedent of Organizational Social Capital. Journal of Business Ethics, 78(3): 329.

Payne, W., Reynolds, M., Brown, S., & Fleming, A. 2003. Sports role models and their impact on participation in physical activity: a literature review Victoria: VicHealth.

Perks, T. 2007. Does Sport Foster Social Capital? The Contribution of Sport to a Lifestyle of Community Participation. Sociology of Sport Journal, 24(4): 378-401.

Peters, J. C. 2006. Obesity prevention and social change: What will it take? Exercise and Sport Sciences Reviews, 34(1): 4-9.

Peterson, G. L. & Arnold, J. R. 1987. The economic benefits of mountain running: the Pike's Peak Marathon. Journal of Leisure Research, 19(2): 84-100.

PIAS. 2006. National People and Pets Survey. Australia: Pet Care Information and Advisory Service.

Platow, M. J., Durante, M., Williams, N., Garrett, M., Walshe, J., Cincotta, S., Lianos, G., & Barutchu, A. 1999. The contribution of sport fan social identity to the production of prosocial behavior. Group Dynamics, 3(2): 161-169.

Pretty, J., Peacock, J., Sellens, M., & Griffin, M. 2005. The mental and physical health outcomes of green exercise. International Journal of Environmental Health Research, 15(5): 319-337.

Proper, K., van den Heuvel, S. G., De Vroome, E. M., Hildebrandt, V. H., & Van der Beek, A. J. 2006. Dose-response relation between physical activity and sick leave. British Journal of Sports Medicine 40(2): 173-178.

Putnam, R. 1995. Bowling Alone: America's Declining Social Capital. Journal of Democracy, 6(1): 65-78.

Putnam, R. 2000. Bowling Alone. New York, USA: Simon & Schuster.

Putnam, R. 2002. Social Capital Community Benchmark Survey short form: Harvard University.

Radford, P. 2005. Lifting the spirits of the nation: British boxers and the emergence of the national sporting hero at the time of the Napoleonic Wars. Identities, 12(2): 249-270.

Repucom International. 2008. 2008 Hawthorn FC Report. Hobart: Tourism Tasmania.

Rosen, S. 1974. Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. Journal of Political Economy, 82(Jan/Feb): 34-55.

Rothman, K. & Greenland, S. 1998. Modern Epidemiology (Second ed.): Lippincott Williams & Wilkins.

RTBG. 2009. Annual Report 2008-9. Hobart: Royal Tasmanian Botanical Gardens.

Russell, D., Jensen, B., & Sullivan, C. 1993. The Business of Sport and Leisure: the economic and social impact of sport and leisure in New Zealand. Wellington, New Zealand: Hillary Commission.

Sabatini, F. 2005. Does Social Capital Improve Labour Productivity in Small and Medium Enterprises?: Social Capital Gateway.

Sage, G. H. 1998. Sports participation as a builder of character? The World and I, 3: 629-641.

Sayman, S. & Öncüler, A. 2005. Effects of study design characteristics on the WTA-WTP disparity: A meta analytical framework. Journal of Economic Psychology, 26(2): 289-312.

Schöppe, S., Bauman, A., & Bull, F. 2004. International Review of National Physical Activity Policy: A literature review. Sydney, Australia: NSW Centre for Physical Activity and Health.

Schulenkorf, N. 2008. The role of an impartial change agent in sport event development projects, Sport Management Association of Australia & New Zealand, Fremantle, WA.

Seippel, O. 2006. Sport and social capital. Acta Sociologica, 49(2): 169-183.

SGS Economics and Planning. 2010. Cost Benefit Analysis and Economic Contribution of Community Sport and Recreation Infrastructure: Sport and Recreation Victoria.

Shephard, R. J. 1986. Economic benefits of enhanced fitness.

Sherwood, P. 2007. A Triple Bottom Line Evaluation of the Impact of Special Events: The Development of Indicators. Unpublished PhD, Victoria University, Melbourne.

Shoenhair, C. L. 1989. The influence of long-term exercise on absenteeism, health care costs, and productivity.

Siegfried, J. & Zimbalist, A. 2006. Economics of Sport: The Economic Impact of Sports Facilities, Teams and Mega-Events The Australian Economic Review, 39(4): 420-427.

Small, M. W. 2006. Management development: developing ethical corporate culture in three organisations. The Journal of Management Development, 25(6): 588.

Solberg, H. A. & Preuss, H. 2007. Major Sport Events and Long-Term Tourism Impacts. Journal of Sport Management, 21(2): 4.

Sport Scotland. 2007. The Economic Importance of Sport in Scotland 2004. Sport Scotland Research Digest, 95.

Stephenson, J., Bauman, A., Armstrong, T., Smith, B., & Bellew, B. 2000. The Cost of Illness Attributable to Physical Inactivity in Australia. Canberra: The Commonwealth Department of Health and Aged Care & the Australian Sports Commission.

Suzuki, N. 2007. Sport and Neighbourhood Regeneration: Exploring the Mechanisms of Social Inclusion through Sport. University of Glasgow.

Sweeney Sports. 2009. Sweeney Sports Report. Sydney.

TCF. 2009. Annual Report 2008-9. Hobart: Tasmanian Community Fund.

TGC. 2009. Annual Report 2008-9. Hobart: Tasmania Gaming Commission.

Tourism Tasmania. 2009. Tourism Talk – Industry Newsletter, Vol. 262. Hobart.

Tymon, W. G. & Stumpf, S. A. 2003. Social capital in the success of knowledge workers. Career Development International, 8(1): 12.

Valois, R. F., Umstattd, M. R. e., Zullig, K. J., & Paxton, R. J. 2008. Physical Activity Behaviors and Emotional Self-Efficacy: Is There a Relationship for Adolescents? Journal of School Health, 78(6): 321-327.

van Amelsvoort, L., Spigt, M. G., Swaen, G. M. H., & Kant, I. 2006. Leisure time physical activity and sickness absenteeism; a prospective study. Occupational Medicine-Oxford, 56(3): 210-212.

van der Bij, A. K., Laurant, M. G. H., & Wensing, M. 2002. Effectiveness of physical activity interventions for older adults: a review. American Journal of Preventive Medicine, 22(2): 120-133.

Verschoor, C. C. 2006. The Value of an Ethical Corporate Culture. Strategic Finance, 88(5): 21.

Wann, D. L., Keenan, B., & Page, L. 2009. Testing the Team Identification-Social Psychological Health Model: Examining Non-marquee Sports, Seasonal Differences, and Multiple Teams. Journal of Sport Behavior, 32(1): 112-124.

Warburton, D. & Hendy, P. 2006a. International Comparison of Australia's Taxes. Canberra: Australian Government Treasury.

Warburton, D., Nicol, C., & Bredin, S. 2006b. Health benefits of physical activity: the benefits Canadian Medical Association Journal, 174(6): 801-809.

Wattles, M. G. & Harris, C. 2003. The relationship between fitness levels and employee's perceived productivity, job satisfaction and absenteeism. Journal of Exercise Physiology Online, 6(1): 24-32.

Wesson, K., Wiggins, N., Thompson, G., & Hartigan, S. 2000. Sport and PE: A Complete Guide to Advanced Level Study. London, UK: Hodder & Stoughton.

Wheaton, B. & Beal, B. 2003. 'Keeping it real' - subcultural media and the discourses of authenticity in alternative sport. International Review for the Sociology of Sport, 38(2): 155-176.

Wheeler, S. & Hughes, H. M. 1968. Controlling Delinquents. HOboken NJ: John Wiley and Sons.

Whitson, D. & Horne, J. 2006. Underestimated costs and overestimated benefits? Comparing the outcomes of sports mega-events in Canada and Japan. Sociological Review, 54(Suppl. 2): 71-89.

WHO. 2008. The Global Burden of Disease, 2004 Update. Geneva: World Health Organisation.

Whynes, D. K. & Sach, T. H. 2007. WTP and WTA: Do people think differently? Social Science & Medicine, 65(5): 946-957.

Wolfe, R. A., Weick, K. E., Usher, J. M., Terborg, J. R., & et al. 2005. Sport and Organizational Studies: Exploring Synergy. Journal of Management Inquiry, 14(2): 182.

Woodhouse, A. 2006. Social Capital and Regional Development in Regional Australia: A Case Study. Journal of Rural Studies, 22(1): 83-94.

Woodward, K. 2007. On and off the pitch - Diversity policies and transforming identities? Cultural Studies, 21(4-5): 758-778.

Woolcock, M. 1998. Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework. Theory and Society, 27: 151-208.

Appendices

Appendix 1 – Allocation of SPR-attributable household expenditure

Alcoholic beverages: The very strong association between SPR and the alcohol industry (Jones, Phillipson, & Lynch, 2006) lead us to conservatively estimate that 10% of alcohol consumption is either SPR-related or motivated.

Animal expenses: 65% of pet ownership is known to be of dogs and horses (PIAS, 2006). Because of the strong (but imperfect) association between the ownership of these animals and physical recreation (Deakin University, 2007), we consider 50% of all household expenditure on animals to be SPR-related.

Cash gifts and donations to charity: It is known that in 2006, 76.9% of Tasmanians made charitable donations, of which 15.6% were directed to SPR (ABS, 2007); therefore, 12.0% of total household expenditure on this category is assumed to be SPR-related.

Childcare services: It is estimated that 25% of child care activity is made up of structured and unstructured physical play.

Clothing: As approximately 5% of household expenditure (excluding clothing) is made on SPR, we continue the assumption here.

Education: 3.7% of education fees for primary and secondary schools are allocated to SPR, as per the rationale for government expenditure in this domain.

Health: This is discussed separately at Appendix 2.

Meals out and fast foods: It is assumed that one unit in twenty is SPR-related or motivated.

Media (including book, magazine, newspaper, audiovisual and internet expenditure): As a proxy for how much people rely on their personal media for SPR, we considered the OzTam television survey ratings for 2009 (OzTam, 2010). Within that, we looked at SPR-related channels as a percentage of total subscription television ratings. SPR was found to account for 11.1% of all subscription television viewing.

Tourism: The separate estimate of 29.1% (see Commercial) of inbound tourism expenditure being SPR-dependant is assumed to apply equally to Tasmanian residents.

Transport: It is assumed that one unit in twenty is SPR-related or motivated. The transport total is discounted by the expenditure line 'purchase of bicycles', as this is wholly attributed to SPR.

Appendix 2 – The cost of SPR injury

One of the perceived risks of SPR participation is injury and its subsequent expense. Unfortunately, there has been no reliable estimate of the cost of sports and physical recreation related injuries in Australia since 1990. At that time, Egger suggested that direct health and other indirect losses (including impacts on productivity and quality of life) annually cost the Australian economy $1 billion (Egger, 1991).

In the 30 years since, there have been significant changes in how sporting bodies and individual participants approach injury prevention. Our management of SPR injuries has significantly advanced, and the methodology of Egger's original report has been disputed (Department of Health and Ageing, 2003). This is therefore the first original Australian effort in many years to calculate the economic cost of SPR-related injuries.

The most recent estimate of total health expenditure in Tasmania is from 2007 to 2008 (AIHW, 2009b). Indexed in Table A2.1, below, it includes all private and public recurrent and capital expenditure on hospitals, medical services, dental services, patient transport services, other health practitioner services, community and public health services, medications, aids and appliances, health research and the administrative systems that support these services.

Department of Health and Ageing figures also show that injury accounts for 6.5% of the total of Australia's health care expenditure (AIHW, 2009b). ABS research indicates that injuries resulting from participation in SPR account for 1.9% of all of injuries (ABS, 2003). Therefore the cost of SPR-related injury in Tasmania is estimated to be 0.13% of all of 2008-09 health care expenditure.

From this, we are able to conclude that the sum of expenditure on SPR-related injury in Tasmania in 2008-09 was $3.1 million. Although this figure may appear to be quite low, it is consistent with international reports showing the direct, national cost of SPR injury to be as low as 0.07% (Cumps, Verhagen, Annemans, & Meeusen, 2008).

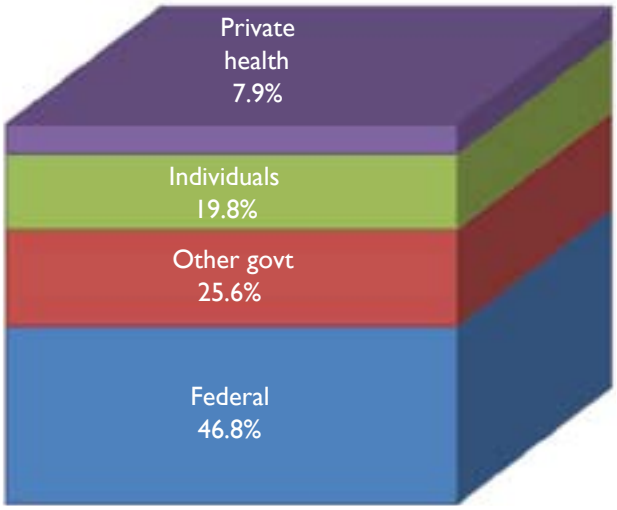
Table A2.1 – The cost to Tasmania of SPR-related injury (2008-09)

Total cost of Health Care in Tas (2007-08)	$ 2 360.0m	
CPI Health (Hobart)	105.1%	$ 2 480.4m
Cost of Injury 6	.5%	$ 161.2m
Cost of SPR injury	1.9%	**$ 3.1m**

Note that by this reckoning the cost of SPR injury Australia wide would be $137.5 million. Although this figure is vastly lower than previous estimates, it only values the current, systematic costs of SPR injury and does not include potential quality of life and productivity losses. These are more fully considered by this report in the section on Productivity benefits.

The private versus public allocation of this expense, shown in Figure A2.1, is specific to Tasmania and calculated using the forementioned Australian Institute of Health and Welfare data on the cost of Health Expenditure (AIHW, 2009b). This has informed our allocations of expenditure in the section of this report on Current costs.

Figure A2.1 – The burden of total health care costs in Tasmania (2007-08)



Appendix 3 - Government expenditure on SPR

Table A3.1 – Tasmanian Government expenditure on SPR (2008-09)

Output group	% SPR	Total SPR ($'m)	Source
SRT	100.0	$8.0	(DEDTA, 2009)
Parks & Wildlife Service	100.0	$22.2	(DEPHA, 2009)
Royal Tasmanian Botanical Gardens	100.0	$2.7	(RTBG, 2009)
Inland Fisheries Service	100.0	$1.3	(IFS, 2009)
Marine and Safety Tasmania	39.7	-$0.1	(MAST, 2009)
Tourism	29.1	$8.0	(DEDTA, 2009)
Gaming Commission	25.0	$1.2	(TGC, 2009)
Tasmanian Community Fund	7.0	$0.4	(TCF, 2009)
Education	3.5	$28.6	(DoE, 2009)
Corrective Services	2.0	$1.0	(DoJ, 2009)
Health (SPR injuries)	0.1	$0.8	Appendix 2
		$70.7	

All figures are sourced from annual reports' Statements of Income and Expenses, and are net of government appropriations and depreciation. The SRT total has been further discounted by the expenditure it disperses on behalf of other agencies; namely, Federal Government and Tasmanian Gaming Commission grants. The Parks and Wildlife, Botanical Gardens and Inlands Fisheries Services are all assumed to be 100% responsible for the conservation and maintenance of SPR spaces and services, even though an indistinguishable number of users may not engage with their facilities in that way. This is because in the alternative case, where these services are not funded, significant SPR resources would be entirely denied to the community.

Other allocations are made on the following grounds:

Marine and Safety Tasmania: proportion of recreational to commercial MAST staff. MAST also made a small profit in 2008-09 by the criteria applied here.

Tourism: as per the rationale in the Commercial section of this report.

Education: according to the Teacher's Registration Board of Tasmania, 3.7% of all Tasmanian teachers are qualified to teach physical education; this figure is discounted by a further 5% to allow for the proportion of the Education Department's activities that are not related to schooling (such as the State Library Service).

Tasmania Gaming Commission and Tasmanian Community Fund: both of these bodies report an allocation of funds to SPR activities and enterprises.

Corrective Services: in the absence of reliable advice, it is supposed that 2% of corrections activity supports SPR.

In the table below, the Tasmanian allocation of SPR funding that devolves from the Australian Sports Commission (ASC) is calculated using the proportion of ASC staff who are based in Tasmania. This is likely to be an over-estimate, as the Australian Sports Foundation (the most relevant Output Group of the ASC) directly contributed less than $50 000 to Tasmanian SPR in 2007-08.

Table A3.2 – Federal government expenditure on SPR in Tasmania (2008-09)

Output group	% SPR	Total SPR ($'000)	Source
Grants to SRT	100.0	$20.0	(DEDTA, 2009)
Australian Sports Commission	0.7	$ 1 506.0	(ASC, 2009)
Health (SPR injuries)	0.1	$ 1 464.1	Appendix 2
		$ 2 990.0	

Appendix 4 - Opportunity cost of labour in Tasmania

Table A4.1 – Opportunity cost of labour in Tasmania (2008-09)

	Full-time Tas	Part-time Tas	Total Population	Full-time $/hr	Part-time $/hr	Weighted Average	less 35% MTR
15–24	22 800	17 500	65 851	$15.62	$15.11	$9.42	$6.12
25–34	33 300	10 500	57 054	$26.08	$31.56	$21.03	$13.67
35–44	37 700	15 700	66 750	$30.59	$34.12	$25.30	$16.45
45–54	43 200	15 900	73 481	$30.74	$35.37	$25.73	$16.72
55–64	22 600	12 800	65 011	$29.53	$34.93	$17.14	$11.14
65 +	3 200	3 300	76 901	$24.86	$31.96	$2.41	$1.56
	(ABS, 2010c)		(ABS, 2010b)	(ABS, 2010d)			(Warburton et al., 2006a)

In the absence of reliable data to the level of detail required, wage and gender parity is assumed.

Appendix 5 – Tasmanian Government SPR assets

Table A5.1 – Tasmanian Government SPR assets (2008-09)

Output Group (OG)	OG Assets ($'m)	% SPR	SPR Assets ($'m)
SRT	$31.01	00.0	$31.0
Parks & Wildlife	$617.2	100.0	$617.2
Education	$808.1	*See below*	$108.9
Botanical Gardens	$15.51	00.0	$15.5
Inland Fisheries Service	$6.0	100.0	$6.0
Marine and Safety Tasmania	$15.2	39.7	$6.0
Health	$ 2 050.9	0.1	$2.5
Corrective Services	$89.92	.0	$1.8
Tourism	$1.02	9.1	$0.3
			$789.5

See *Appendix 3* for a detailed list of methods and sources. The only exception to that is the method used to ascribe value to Department of Education assets. In this instance it was considered more reliable to assume that one-third of school land and 5% of school infrastructure were dedicated to SPR. Assets were then valued on the assumption that infrastructure is worth twice as much as unimproved land.

Appendix 6 – The cost of disease in Tasmania

The total cost of health care in Tasmania in 2008-09 was **$2 480.4 million** (*Appendix 2*).

Table A6.1 – The cost of disease in Tasmania (2008-09)

	% of health expenditure [9]	Condition	Relevant %	Cost to Tas ($'m)
All of cardiovascular	11.3	Coronary Heart Disease [10]	30.5	$85.5
		Hypertension [11]	28.4	$79.5
		Stroke [12]	9.2	$25.8
All of mental	7.8	Depression [13]	25.9	$50.1
All of diabetes	1.9	Type 2 Diabetes [14]	70.0	$33.0
All of cancer	7.2	Breast cancer [15]	12.2	$21.8
		Colorectal cancer [16]	13.0	$23.2
All of injury	6.5	Falls [17]	4.3	$6.9
Osteoporosis	2.3 [18]			$57.0
				$325.7

9 AIHW. 2009b. Health Expenditure Australia, 2007-8. Canberra: Australian Institute of Health and Welfare.

10 AIHW. 2008a. Health care expenditure on cardiovascular diseases 2004–05. Canberra: Australian Institute of Health and Welfare.

11 AIHW. 2000. Australia's Health 2000. Canberra: Australian Institute of Health and Welfare.

12 AIHW. 2008a. Health care expenditure on cardiovascular diseases 2004–05. Canberra: Australian Institute of Health and Welfare.

13 AIHW. 2006. Australia's Health 2006. Canberra: Australian Institute of Health and Welfare.

14 AIHW. 2009a. Insulin-treated diabetes in Australia 2000-2007. Canberra: Australian Institute of Health and Welfare.

15 AIHW. 2008b. Cancer in Australia: an overview, 2008. Canberra: Australian Institute of Health and Welfare.

16 AIHW. 2008b. Cancer in Australia: an overview, 2008. Canberra: Australian Institute of Health and Welfare.

17 ABS. 2003. National Health Survey: Injuries, Australia (2001) Vol. 4384.0. Canberra: Australian Bureau of Statistics.

18 AIHW. 2007. A picture of osteoarthritis in Australia. Canberra: Australian Institute of Health and Welfare.

Appendix 7 – SPR imports

SPR is known as an independent driver of regional economic development; however, there is a body of economic scholarship on sports events and infrastructure that argues, in net terms, SPR is at best revenue neutral, merely diverting consumption from other sources (Coates & Humphreys, 2003; Siegfried & Zimbalist, 2006; Whitson & Horne, 2006). Yet from a regional perspective, if the income is externally sourced then there is an obvious net gain; albeit, at a third party's expense.

Tourism demand, for one, increases the welfare of the community through the provision of goods and services that could not otherwise be more conveniently sourced (Solberg & Preuss, 2007). Indeed, high profile SPR activity can create entrepreneurial opportunities and seasonal demand for local industry that would only go to other districts if it were not pursued. Increased workforce re-skilling, business migration and even export demand are other potential outcomes. And, perhaps in response to the criticism of economic rationalists, mega-events of the modern era are as much focussed on legacies in transport, communications and other community infrastructure as they are on the event itself; indeed, many local event 'bids' are justified on this basis.

Even without regard to the wellbeing benefits discussed earlier, a region's reputation for SPR may provide it with a competitive advantage over its peers. So, from the community's point of view, and acknowledging the holistic impacts discussed elsewhere in this report, the public funding of 'lighthouse' SPR projects is often a preferred form of economic stimulus (Andersson, Rustad, & Solberg, 2004).

There are a number of Tasmanian businesses producing SPR goods and services for consumption off-shore. The most prominent of these is Betfair, whose proprietary sports wagering products are sold from their Hobart base to a global market. Several smaller businesses, particularly in the maritime leisure industry, are also making their mark on mainland Australia and around the world. Unfortunately, however, commercial confidences have prevented this study from reliably estimating the value of the SPR-related exports of manufactured goods and services in Tasmania. Although their overall impact may be marginal when compared to other inputs, this is encouraged as a direction for future research.

The other export industry that intersects with sport and physical recreation is tourism. Between July 2008 and June 2009, over 900 000 tourists visited Tasmania via the major air and sea ports.[19] Spending nearly $1.5 billion, these visitors were a major contributor to the gross state product of Tasmania (DEDTA, 2010). Using destination research conducted by the Department of Economic Development, Tourism and the Arts, we were able to identify nine activities that could be considered wholly sport and physical recreation:

- bushwalking for two to four hours
- bushwalking for more than four hours but not overnight
- bushwalking overnight or longer
- canoeing / sea kayaking
- fishing for trout
- other fishing
- scuba diving / snorkelling
- riding a bicycle or mountain bike
- playing golf

Discounting by the total numbers of visitors who participated in more than one of these activities, we are able to arrive at an estimate of the percentage of tourism to Tasmania that is SPR-motivated. Note that activities with a potential SPR relationship—such as visiting National Parks or four-wheel driving—were excluded, and that data on activities such as sailing and adventure sports were not collected. Our estimates using the available data are therefore likely to under-represent the extent of SPR-related tourism in Tasmania.

[19] This does not include cruise ship and naval visitors.

On the other hand, we were able to consider those tourists whose visit was for the purpose of witnessing or participating in a specific SPR event. A number of these events are supported by Events Tasmania, who collect their own data on visitor spending. Significant events in this regard include Hawthorn AFL games, the Sydney to Hobart Yacht race, international cricket series, and various national championships. It is therefore reasonable that the whole of their spending could be considered SPR-induced.

To avoid double counting, however, we assumed that these visitors were twice as likely to participate in one of the activities listed above, so we discounted their expenditure by that amount. As with the gross impacts, we could not assess the tourism value of events that were not supported by government, such as end-of-season sporting trips.
It was found that over 265 000 people visited Tasmania to participate in SPR activities in 2008-09. As 29.1% of the total tourism market, they were responsible for spending $428.9 million. Bushwalking (for greater than two hours) was the activity most participated in by SPR tourists, accounting for over 200,000 distinct occurrences. An additional $22.7 million was identified as being the unique contribution of those attending SPR events. Direct expenditure on SPR tourism in 2008-09 was therefore **$451.6 million.**

Note that the entire expenditure of relevant tourists is counted here, even though an (unknown) fraction of this amount would have uniquely been spent on SPR. This is because we assume that if the SPR experience were not available to this group of Tasmanian visitors, then they would have elected to spend their time and money in another market.

Appendix 8 – Principles of input-output models

The principles of input-output models are described briefly here. The essential feature is that the output of any industry is not entirely sold on a market for the industry's product; some of it will be used by industries associated within the chain of production as an input for production; an example is the output of the sheet metal industry which will be in the large part purchased by motor vehicle and white goods manufacturers as input to the production of motor vehicles and refrigerators. More relevant local examples are the output of the agricultural industries, which provide inputs for the production of food and beverages, dairy production and support the manufacture of confectionary and dairy products; timber harvested by forest companies is sold to timber processors; while mining output is an input to the mineral processing industries. This backward and forward linking structure is an essential feature of an I/O table and defines its set of inter-industry relationships.

The development of an I/O model applied in this analysis is based on a transaction table developed by the ABS with the following structure:

- Each row shows the distribution of one industry to other industries and to final demand, while each column records the industry in questions' acquisition of inputs from other industries in an economy. These are referred to as 'intermediate purchases' to distinguish them from final purchases/sales.
- The table contains four quadrants:
    - The processing sector is shown as Quadrant 1 and records the flow of goods and services between individual industries during a year.
    - The second quadrant records the consumption expenditures of final buyers and the other industry sectors from which they are made. A particular feature of Quadrant 2 is the presence of capital items which are included as part of the total expenditure of the individual industries, however, these capital goods are not used up for production in the current period and so they are shown for the production sector only.
    - Quadrant 3 records payments for the use of primary inputs in particular to labour (wages, recorded as Compensation Of Employees), to corporations as profits or rents (Gross Operating Surplus), to governments in various tiers as indirect taxes and charges and to importers. The value added by each industry to total national income, Gross Domestic or State Product measured at factor (input) cost is the combination of some of these payments as follows:

$$Value\ Added_i = WSS_i + GOS_i + Indirect\ taxes_i - subsidies_i$$

      So the value added by industry i is the sum of wages, salaries and supplements or compensation of employees (COE_i) paid to labour, the gross operating surplus (GOS_i) plus indirect taxes and charges net of subsidies paid by government to industry i. The sum of all the value added by the i industries constituting the economy is the value of Australia's national income, namely GDP.

      One of the objectives of the modelling is to determine how much GDP increases in response to the expenditure of an XXX project and in response to the increased expenditure by persons in response to XXX project, for example increased tourism.

In our analysis we also included an intermediary Table 1 (with matrix identifier Z) which indicates the proportion of total supply of an industries output is met by a given industry. This is necessary due to the fact that sum industries produce goods that are measured as part of another sector (for example the 'Other Industries' sector producing service that are recorded as 'Personal Services'). At this stage we also exclude the leakage associated with imports. This occurs when demand results in output of a particular sector being imported from overseas.

Figure A8.1 – Quadrants of the transaction table

STRUCTURE OF AUSTRALIAN INPUT-OUTPUT TABLES

Direct allocation of imports, Basic prices, Recording of intra-industry flows

	To / From	Row prefix	*Intermediate Uses*						*Final Uses*								
			Agriculture, etc	*Mining*	*Manufacturing, etc*	*Construction*	*Services*	*Intermediate uses (sub-total)*	*Final consumption expenditure — household*	*Final consumption expenditure — government*	*Gross fixed capital formation — private*	*Gross fixed capital formation — public enterprises*	*Gross fixed capital formation — general government*	*Changes in inventories*	*Exports of goods and services*	*Final Uses (sub-total)*	*Total supply (grand total)*
	Column prefix		0101-0400	1100-1500	2101-3701	4101-4102	4501-9601		Q1	Q2	Q3	Q4	Q5	Q6	Q7		
Intermediate uses	Agriculture Mining Manufacturing, etc. Construction Services	0101-0400 1100-1500 2101-3701 4101-4102 4501-9601	QUADRANT 1 INTERMEDIATE USE						QUADRANT 2 FINAL USE								
	Intermediate uses (sub-total)																
Primary inputs	Compensation of employees	P1	QUADRANT 3 PRIMARY INPUTS TO PRODUCTION						QUADRANT 4 PRIMARY INPUTS TO FINAL USE								
	Gross operating surplus and mixed income	P2															
	Taxes on products (net)	P3															
	Other taxes on production (net)	P4															
	Imports	P5															
	Australian production																

The shaded areas correspond to aggregates shown in the Gross Domestic Product Account.

corresponds to aggregates shown as the components of gross domestic product, income approach.

corresponds to aggregates shown as the components of gross domestic product, expenditure approach.

The math of I/O modelling

The transaction table may be presented in the following matrix form where Xij is the amount of industry j's output purchased by industry i as an input and Di is the final demand for industry i's output.

The transaction table above is defined by dividing the elements of the matrix above by the current value of industry i's output. By this definition:

$$a_{ij} = \frac{x_{ij}}{x_j} \quad (1)$$

These aij are the technical coefficients of production and they represent the amount of industry i's output required to produce a unit of output in industry j.

From (1) we can write:

$$x_{ij} = a_{ij} X_j \quad (2)$$

and the output for industry i is the sum of intermediate sales and purchases plus the final demand for i's output (Di) as follows:

$$X = AX + D \quad (3)$$

Where X is a vector of industry outputs, D is a vector of final demands and A is an ixj matrix of technical coefficients.

The expression (3) can be solved for X as a function of D:

$$X - AX = D \tag{4}$$

$$X(1 - A) = D \tag{5}$$

$$X = (1 - A)^{-1}D \tag{6}$$

$$X = BD \tag{7}$$

The solution vector represents the output of industries as some multiple of final demand (D) the multiple is the matrix (I-A)-1=B. This is known as the Leontieff inverse after its creator. Now B is structured in the following manner:

$$B = \begin{bmatrix} b_{11} & b_{12} \cdots\cdots b_{ij} \cdots\cdots b_{1n} \\ \vdots & \vdots \\ b_{21} & b_{22} \cdots\cdots b_{2j} \cdots\cdots b_{2n} \\ \vdots & \vdots \\ b_{i1} & b_{i2} \cdots\cdots b_{ij} \cdots\cdots b_{in} \\ \vdots & \vdots \\ b_{n1} & b_{n2} \cdots\cdots b_{nj} \cdots\cdots b_{un} \end{bmatrix} \tag{8}$$

This is referred to as the table of interdependence coefficients and measures the direct, induced and indirect effects of a change in final demand for one of the industry outputs. The columns of this interdependence coefficient table are the output multipliers.

What do I/O output multipliers tell us? I/O output multipliers measure the changes in all industry outputs generated by a change in the final demand for any one output. For example, if the demand for agricultural output in Tasmania increased by 10%, then I/O output multipliers measure the impact on all industry output including agriculture.

Employment multipliers describe the impact of a change in the final demand for a specific industry's output on employment in the same and all other industries. These I/O employment multipliers are derived from employment equations, which are derived in turn by simply multiplying the output equations for each industry by the employment (E_i)/Output (X_i) ratio for the industry in question. So the employment equation for industry 1 is found by multiplying (1) though by E_i/X_i. Then I/O employment multipliers are found in the same way by inverting the set of employment equations solving for employment in industry i.

Wage multipliers are found in an identical fashion, but on this occasion wage equations are employed to derive these. The wage multiplier measures the change in all industry wage incomes flowing from a change in any of the final demands.
However, there is also a wage-multiplier effect which effectively 'closes' the model with respect to the household sector. The wage-multiplier identifies the extent to which increased household income from wages raises expenditure in the community, thereby generating additional economic activity and employment. To incorporate the impact of increased wages on household final consumption expenditure (a component of final demand D) we derive a matrix C which is parallel to the matrix A. The element of matrix C, cij relate the expected increase in household final consumption expenditure associated with a unit increase in output by industry j.

Therefore final demand D contains a dependent component based on wages and an independent component that with identify as FD. We describe this relationship in equation

$$FD = D - CX \quad [0.1]$$

The expression [1.5] can be substituted into [1.4] while maintaining the equality as follows:

$$Y = AX + CX + FD \quad [0.2]$$

The expression [1.6] can then be solved for equilibrium X = Y as a function of FD:

$$Y - AY - CY = FD \quad [0.3]$$

$$Y(1 - A - C) = FD \quad [0.4]$$

$$Y = (1 - A - C)^{-1} FD \quad [0.5]$$

$$Y = (1 - A - C)^{-1} FD \quad [0.6]$$

$$Y = X = L \times FD \quad [0.7]$$

The solution vector B represent the output of industries as some multiple of final demand (FD) the multiple is the matrix $(1 - A - C) - 1 = L$. The structure of L is a table of interdependence coefficients and measures the direct, indirect and induced (where the model is closed) effects of a change in final demand for one of the industry outputs. The columns of this inter-dependence table are the output multipliers.

Output I/O multipliers measure the change in all industry outputs generated by a change in the final demand for any one output. Wage, value-added and employment multipliers are calculated based on the output multipliers. It is assumed that the relationship between output of a given sector and its wage, value-added and employment are constant (effectively determined by technology and structural parameters in the industry) so that if output in a sector increases by a given amount, then the value-added, wage and employment impacts can be calculated using a constant ratio for each industry.

Gross State Product (GSP) multipliers measure the contribution of a final demand change to each industry's value added or its individual contribution to GSP. GSP multipliers are derived from total income equations which are output equations converted to total income relationships by applying value added/ output ratios to each industry's outputs.

All four sets of multipliers are applied to the task of identifying employment, GSP, wage and output effects of the XXXX project not proceeding.

Here, a distinction should be made between Type I and Type II multipliers. Type I income or output multipliers are the ratio of the direct plus indirect income or output change of demand to the direct income change resulting from a dollar increase in final demand for any given industry.

Type II multipliers are those derived mathematically above and can be read off the column of the B matrix in (7). In either case, type I or II, the I/O model is closed with respect to households which is the case here.

The practicality of I/O models depends on certain properties and assumptions. First, a workable I/O model will be mathematically stable which happens if the following holds:

The table of technical coefficients must have at least one column which sums to a number less than one. No column in the table can exceed one in the aggregate (no industry can pay more for its inputs than it receives from the sale of its output).

The following assumptions underpin all practical I/O models:

- A single production function exists for all firms in an industry.
- This production function must be linear and be homogeneous of degree I (Constant Returns to scale applies).
- There is no substitutability between factions of production (labour and capital).

Appendix 9 – SPR WTP and WTA survey method

Sample (Newspoll, 2010)

- The poll was conducted nationally among 1 200 respondents aged 18 years and over.
    - Telephone methodology selected over online for the following reasons:
    - Telephone is consistently the most accurate method for conducting quantitative research, due to its ability to provide representative samples. The telephone omnibus is based on a **probability sample** which allows every potential respondent in the population to have the opportunity to be selected for any given survey.
    - Online methodology can sometimes provide cost savings, but at the expense of reduced certainty about the representativeness of the sample and therefore the accuracy of any findings. Online studies use a non **probability sample** by which respondents are selected from an online access panel (OAP). Only those people who are members of the panel are available to answer the survey.
    - Larger online access panels range in size from 150 000 to 200 000 members, equivalent to between 1% and 1.5% of the adult population. This compares with 65% to 80% of the adult population or about 13.6 million people accessible by land-line telephone.
    - We know from experience that there are demographic differences between people gained for online interviews and a representative national sample, in particular in relation to physical activity.
        - Online respondents engage in significantly lower levels of physical activity than telephone respondents.
        - A recent comparison between the online omnibus and the telephone survey indicated active participation rates were around 10% lower among the online sample.
        - This difference was evident across all age groups, and is similar to an earlier investigation in 2007.
- Respondents for the telephone sample were selected via a random sample process which included:
    - a quota being set for each capital city and non-capital city area, and within each of these areas, a quota being set for groups of statistical divisions or subdivisions;
    - random selection of household telephone numbers within each area;
    - random selection of an individual in each household by a 'last birthday' screening question.
- Telephone numbers are selected using AMSRO endorsed SamplePages. The advantages of using SamplePages include:
- access to a directory-based database of more than 6 million residential numbers, updated monthly and verified regularly for consistency
- the most complete, representative and accurate list-based sample directory available for the research industry.

Interviewing (Newspoll, 2010)

- Interviews were conducted by telephone over the period of 5–7 March 2010 by fully trained and personally briefed interviewers.
- To ensure the sample included those people who tend to spend a lot of time away from home, a system of call backs and appointments was incorporated.

Weighting (Newspoll, 2010)

- To reflect the population distribution, results were post-weighted to Australian Bureau of Statistics data on age, highest level of schooling completed, gender and area.

ISO 20252 - Market, Social and Opinion Research (Newspoll, 2010)

- This study was carried out in compliance with ISO 20252 - Market, Social and Opinion Research.

Survey instrument (Newspoll, 2010)

SECTION F - PROG NOTE: ASK ALL RESPONDENTS

F1 Now a few questions about physical activities you participate in for exercise, recreation, or sport. How often, if ever, do you personally participate in any physical activities for exercise, recreation, or sport? Would it be...? READ OUT

PROG NOTE:
- SINGLE RESPONSE

1	6 or 7 times a week or more
2	3 to 5 times a week
3	1 or 2 times a week
4	About once a fortnight
5	Less often
6	Or, never
7	DO NOT READ Don't know

F2 Imagine there was a pill you could take **once a week**, and it gave you all of the physical and social benefits of **regular** participation in sport and physical recreation. How much, if anything, would you be prepared to **pay** for **each** of those pills? RECORD TO NEAREST DOLLAR AS A FOUR DIGIT NUMBER. IF RESPONDENT SAYS DON'T KNOW PROBE FOR BEST ESTIMATE. IF STILL DON'T KNOW RECORD AS '9999'. IF $9998 OR MORE RECORD AS '9998'. IF A RANGE GIVEN, EG $20 TO $30, RECORD LOWER NUMBER (0020). IF WOULD NOT PAY ANYTHING \ NOT BUY IT RECORD AS '0000'.

PROG NOTE:
- ALLOW FOR A 4 DIGIT RESPONSE
- ALLOW FOR A RANGE FROM 0000-9999

$ ___ ___ ___ ___

PROG NOTE: ASK IF PARTICIPATE IN SPORT AND RECREATION IE CODE 1-5 IN F1. OTHERS GO TO NEXT SECT

F3 What would you have to be paid to give up one year of sport and physical recreation? In other words, you would lose all of the physical and social benefits of your current participation. RECORD TO NEAREST DOLLAR AS A SIX DIGIT NUMBER. IF RESPONDENT SAYS DON'T KNOW PROBE FOR BEST ESTIMATE. IF STILL DON'T KNOW RECORD '999999'. IF $999997 OR MORE RECORD '999997'. IF A RANGE GIVEN, EG $200 TO $300, RECORD LOWER NUMBER (000200). IF WOULD NOT GIVE UP SPORT \ PHYSICAL RECREATION FOR ANY AMOUNT RECORD AS '999998'.

PROG NOTE:
- ALLOW FOR A 6 DIGIT RESPONSE
- ALLOW FOR A RANGE FROM 000000-999999

$ ___ ___ ___ ___ ___ ___

DEMOGRAPHICS

1 To make sure we're speaking to a cross-section of people, please tell me if you are aged...? READ OUT 01-04 IF AGED 18-34 OR 05-11 IF AGED 35 AND OVER

18-19	01	40-44	06
20-24	02	45-49	07
25-29	03	50-54	08
30-34	04	55-59	09
35-39	05	60-64	10
		65+	11
		REFUSED	12

2 RECORD SEX

MALE	1
FEMALE	2

3 Are you the person who is most responsible for doing the household grocery shopping?
IF UNSURE / SHARED EQUALLY WITH SOMEONE ELSE CODE AS "YES" IF CODE 1

YES	1
NO	2

4(a) How many people aged 18 years or over live in your household, including yourself?

4(b) And how many children aged 17 years or younger live in your household?

	—4(a)— ADULTS	—4(b)— CHILDREN
ONE	1	1
TWO	2	2
THREE	3	3
FOUR	4	4
FIVE	5	5
SIX+	6	6
NONE	-	7
DON'T KNOW / REFUSED	8	8

5 Are you in paid employment full time, part time or not at all?
IF UNSURE / CASUAL / SELF EMPLOYED: Is that closer to full time or part time hours?

FULL TIME	1
PART TIME	2
NOT AT ALL	3
DON'T KNOW / REFUSED	4

6 To help us ensure we have a representative sample could you please tell me the highest level of primary or secondary school you personally have completed? Was it...? READ OUT 1-3

YEAR 9 OR BELOW	1
YEAR 10	2
OR, YEAR 11 OR 12	3
DON'T KNOW / REFUSED	4

7 And apart from primary and secondary school, what is the highest level of education you personally have completed? Was it...? READ OUT 1-3

	2R
A DIPLOMA OR CERTIFICATE FROM A COLLEGE OR TAFE, INCLUDING AN APPRENTICESHIP	1
A DEGREE OR DIPLOMA FROM A UNIVERSITY	2
OR, NONE OF THESE	3
REFUSED / DON'T KNOW	4

8 Which one of the following best describes your present marital status?
READ OUT 1-6

	2R
NEVER MARRIED	1
DEFACTO OR LIVE TOGETHER	2
MARRIED	3
SEPARATED BUT NOT DIVORCED	4
DIVORCED	5
WIDOWED	6
REFUSED	7

9 Could I please have the occupation of the main income earner of your household?
IF NECESSARY: Could I also have the position or job title of the main income earner of your household?

_____

_____

10 Is your household's combined annual income from all sources, before tax... READ OUT A-D. Would that be...? READ OUT 02-04 IF 30 TO 89, 06-08 IF 60 TO 89 OR 10-11 IF 90 THOUSAND OR MORE

INTERVIEWER INFORMATION

UNDER $30,000 PA IS UNDER $577 PER WEEK
$30,000-$39,999 PA IS $577-$769 PER WEEK

$40,000-$49,999 PA IS $770-$962 PER WEEK
$50,000-$59,999 PA IS $963-$1,154 PER WEEK
$60,000-$69,999 PA IS $1,155-$1,346 PER WEEK
$70,000-$79,999 PA IS $1,347-$1,538 PER WEEK

$80,000-$89,999 PA IS $1,539-$1,731 PER WEEK
$90,000-$99,999 PA IS $1,732-$1,923 PER WEEK
$100,00-$109,999 PA IS $1,924-$2,115 PER WEEK
OVER $110,000 PA IS OVER $2,115 PER WEEK

A) UNDER 40 THOUSAND DOLLARS	
UNDER 30 THOUSAND	01
OR, 30 TO 39 THOUSAND DOLLARS	02
REFUSED / DON'T KNOW	03
B) 40 TO 79	
40 TO 49 THOUSAND	04
50 TO 59	05
60 TO 69	06
OR, 70 TO 79 THOUSAND DOLLARS	07
REFUSED / DON'T KNOW	08
C) OR, 80 THOUSAND OR MORE	
80 TO 89 THOUSAND	09
90 TO 99	10
100 TO 109	11
OR, 110 THOUSAND DOLLARS OR MORE	12
REFUSED / DON'T KNOW	13
REFUSED	14
DON'T KNOW	15

Data screening

Questions F1– F3 of the survey were designed by the authors of this report and delivered by Newspoll. Despite rigorous off-line testing, question F2 was potentially misunderstood by respondents.

Just over 50% of respondents who reported participating in SPR (at question F1) went on to declare a willingness to pay $0 for an effective substitute (the 'pill' – question F2). By contrast, only 3% of SPR participants reported a WTA score of $0 (question F3).

In practice, however, we know that SPR users have already revealed their preference by paying for their participation. Our conclusion is that many of the respondents to Q1 believed they were being offered a choice between the pill and SPR, and elected to continue SPR (that is, not pay for the pill). This is at odds with our intention to measure the contingent value they place on their SPR participation.

Such a large number of people reporting $0 at this line has the effect of heavily skewing the mean scores we rely on to report our findings (or any other analytic tool we choose to run). For that reason we have excluded $0 responses from SPR participants. Similarly excluding non-respondents has the net effect of reducing our valid sample sizes
(n_{F2} = 475; n_{F3} = 871).

It also has the potential effect of understating the true contingent value that SPR participants place on their involvement. After all, by answering $0, many respondents may have been implying that they would not pay or receive any price to substitute SPR. The correct score by our survey method in these circumstances would be $9,998 (F2), or $99,997 (F3), which, given the high number of $0 respondents, would significantly increase the WTP value.

Glossary

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ANZSIC	Australian and New Zealand Standard Industrial Classification
ASC	Australian Sports Commission
CI	Confidence Interval
CPI	Consumer Price Index
DALY	Disability Adjusted Life Year
ERASS	Exercise, Recreation and Sport Survey
GDP / GSP	Gross Domestic Product / Gross State Product
HES	Household Expenditure Survey
I/O	Input / Output
NPAG	National Physical Activity Guidelines
NSO / SSO	National / State Sporting Organisation
PAR	Population Attributable Risk
RIOM	Regional Input/Output Matrix (Model)
RR	Relative Risk
SPR	Sport and Physical Recreation
SRT	Sport and Recreation Tasmania
VSLY	Value of a Statistical Life Year
WTA	Willingness to Accept
WTP	Willingness to Pay

The value of sport and physical recreation

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